

# **APPENDIX I**

## **APPENDIX I (A). Project Compliance Form**

### **Complete Before Site Visit:**

PROJECT NAME

PERMITTEE

PERMIT DATE AT U.S. ACOE;  
PERMIT DATE AT SFB RWQCB

CORPS & SFB RWQCB PROJECT MANAGERS

CONSULTANT

U.S. ACOE FILE NO.

SFB RWQCB FILE NO. [WDID #]

RESPONSIBLE PARTY & CONTACT INFORMATION

#### **Impacted Project Information:**

PROJECT LOCATION (include Lat/Longs, Geographic Positioning System [GPS], aerial photos, street directions, and/or site diagrams or figures).

PROJECT SIZE

WETLAND TYPE IMPACTED

#### **Mitigation Project Information:**

COMPENSATORY RESTORATION/MITIGATION TYPE

PROJECT SIZE

PROJECT DESCRIPTION

PROJECT GOALS

YEARS OF REQUIRED MONITORING

YEARS OF MONITORING COMPLETED

MONITORING START DATE

## PERFORMANCE CRITERIA

.....

### **Complete At Site After Project Evaluated and Rapid Surveys Conducted:** **WETLAND ASSESSORS**

WETLAND ASSESSMENT DATE & TIME

AGE OF PROJECT

WETLAND ASSESSMENT METHOD USED [e.g., Wetland Ecological Assessment (WEA) which includes Biological Rating Done by BMP Ecosciences; California Rapid Assessment Method (CRAM) when it has been tested and approved; or Wetland Rapid Assessment Procedure (WRAP)]. Note that a form combining the major features in the WEA/BMP/WRAP methods is provided below.

- Field Methods (Standard metrics including hydrology, wildlife habitat, vegetation structure, buffers, surrounding land use. Also note surveys, if any, for plants, birds, mammals, amphibians, reptiles, fish, or invertebrates).
- Site Description
- Site Score

PERMIT COMPLIANCE (if a regulatory project)

OVERALL WETLAND GAIN OR LOSS EXPECTED TO RESULT FROM THIS PROJECT

SITE EVALUATION

- Do the wetlands appear to be developing as planned?
- Were project goals met?
- Is the project in compliance with its permit?
- What ecological values does the site provide?

RECOMMENDATIONS

For COMBINED WEA, BMP, & WRAP METHODS, See APPENDIX I(B).

## **APPENDIX I (B): Wetland Assessment Form (WEA) for San Francisco Bay Projects**

[based on South Florida's Wetland Rapid Assessment Form (WRAP) (Miller & Gunsalus. 1999)]  
**REVISED 3/26/03; 7/3/03 [Note: Still in Draft Form]**

Each variable score is summed and then divided by the total possible maximum score for the variables. The final score is expressed as a number between zero and one.

### **1. WILDLIFE UTILIZATION RATING INDEX (WU)**

The wildlife utilization variable is a measure of observations and signs (i.e. scat, tracks etc.) of wildlife, primarily wetland dependent species or potential predators. In addition, potential wildlife use through the presence of wildlife food sources, nesting areas, roosting areas, den trees, protective cover and landscape position is also considered. Wildlife includes birds, mammals, fish, amphibians, reptiles, and invertebrates. Previous knowledge of site can be used, but state evaluators' level of familiarity of site on should be noted on the site assessment form. Select scores based on agreement with some or all of the bulleted items.

	<u>Score</u>
EXISTING WETLAND EXHIBITS NO EVIDENCE OF NATIVE WILDLIFE	0
<ul style="list-style-type: none"><li>• Existing wetland is heavily impacted.</li><li>• No evidence of native wildlife utilization.</li><li>• Evidence of non-native wildlife species known to adversely affect native species</li><li>• Little or no habitat for native wetland wildlife species.</li></ul>	
EXISTING WETLAND EXHIBITS MINIMAL EVIDENCE OF NATIVE WILDLIFE UTILIZATION	1
<ul style="list-style-type: none"><li>• Minimal evidence of native wildlife utilization.</li><li>• Little habitat for wildlife.</li><li>• Sparse or limited adjacent upland food sources.</li><li>• Site may be located in residential, industrial or commercial developments with frequent human disturbances.</li></ul>	
EXISTING WETLAND EXHIBITS MODERATE EVIDENCE OF NATIVE WILDLIFE UTILIZATION	2
<ul style="list-style-type: none"><li>• Moderate evidence of native wildlife use.</li><li>• Evidence of aquatic macroinvertebrates, amphibians and/or forage fishes; or small or medium-sized mammals and reptiles (observations, tracks, scat).</li><li>• Evidence of use by migrant or resident birds.</li><li>• Adequate adjacent upland food sources.</li><li>• Adequate protective cover for wildlife (can include woody debris for insects, amphibians).</li><li>• Minimal evidence of human disturbance or non-native wildlife known to adversely impact native wildlife species.</li><li>• Site known to harbor a special status species</li></ul>	
EXISTING WETLAND EXHIBITS STRONG EVIDENCE OF NATIVE WILDLIFE UTILIZATION	3
<ul style="list-style-type: none"><li>• Strong evidence of native wildlife utilization including large mammals and reptiles.</li><li>• Abundant aquatic macroinvertebrates, amphibians and/or forage fishes (can include woody debris).</li><li>• Evidence of use by migrant or resident birds.</li><li>• Abundant upland food sources.</li><li>• Negligible evidence of human disturbance.</li><li>• Abundant habitat for native wildlife within the wetland or adjacent upland.</li><li>• Site known to harbor one or more special status species</li></ul>	

**2. WETLAND DOMINANT VEGETATIVE COVER RATING INDEX**

**NOTE: Vegetation can be assessed by EITHER the 3 layer approach presented first, OR the BMP approach presented second, OR both approaches.**

**Note: SCORING: SHALL WE HAVE TOTAL = 3 POINTS Total for Vegetation, LIKE THE OTHER SECTIONS, OR WEIGH DIFFERENT METRICS, OR DIFFERENT STRATA???**

**Objective:** The dominant vegetative cover for trees, shrubs, or emergent/herbaceous variable is a measure of the presence, abundance, appropriateness and condition of vegetative cover within the wetland. By definition, aggressive non-native plant species include exotic and nuisance (i.e., invasive) plant species.

Do one assessment each for each layer: (1) Herbaceous (2) Shrub (3) Tree Canopy.

**HERBACEOUS**

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Note the following vegetation scoring can be used with or instead of the 3 Layer Approach and can also be used with the Buffer Metric (Metric #3).

C-S-R rating system for evaluating the vegetation of restoration projects.

[Source:, Pavlik. 2003. Evaluation of the Vegetation of Wetland Restoration Projects in the San Francisco Bay Area, BMP Ecosciences San Francisco, CA.

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**C = composition (species identity and richness)**

1= almost all CA natives and native to the site, few if any non-natives, none invasive or noxious

2 = mostly CA natives that are native to site but some characteristic species missing, **or**  
an equal mix of CA natives (some may not be native to the site) and non-natives (some  
invasive or noxious)

3 = mostly exotics (many invasive or noxious) with few CA natives

**S = structure (architectural complexity)**

1 = closely resembling an appropriate reference site or template, having the complexity and  
appearance of natural vegetation of its kind

2 = does not resemble a reference or template, but generally or vaguely simulates natural  
vegetation of its kind

3 = does not resemble or simulate natural vegetation

**R = re-establishment (population trajectories)**

1 = dominant native species demonstrate re-establishment under current ecosystem conditions

2 = some native species are reestablishing themselves, others are not and non-natives appear to  
be taking their place

3 = few, if any, native species are reestablishing themselves and non-natives will probably come  
to dominate under current ecosystem conditions

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### 3. ADJACENT BUFFER RATING INDEX

#### Objective

The adjacent buffer variable is a measure of the area adjacent to the subject wetland and the landscape setting of the wetland. This variable is evaluated based on the adjacent buffer size and the ecological attributes (i.e., cover, food source and roosting areas for wildlife) that this area is providing in association with the wetland that is being assessed. Buffers can include open water, other wetlands, transitional areas, and open space.

	<b>Score</b>
NO ADJACENT BUFFER	0
• Buffer non-existent.	
ADJACENT BUFFER AVERAGES 30 FEET OR LESS	1
• Less than 25% plant species which provide wildlife habitat.	
• Not connected or poorly connected to wildlife corridors.	
• Greater than 50% invasive exotic or nuisance plant species.	
ADJACENT BUFFER AVERAGES GREATER THAN 30 FEET BUT LESS THAN 300 FEET	2
• Contains 26% to 50% plant species which provide wildlife habitat.	
• Portions connected with contiguous offsite wetland systems, wildlife corridors.	
• Between 25%-49% invasive exotic or nuisance plant species.	
ADJACENT BUFFER AVERAGES GREATER THAN 300 FEET	3
• Contains >50% plant species that provide wildlife habitat.	
• Less than 25% invasive exotic or nuisance plant species	
• Connected to wildlife corridor or contiguous with offsite wetland system or areas that are large enough to support habitat for large mammals, nesting birds, amphibians, or reptiles.	

#### 4. FIELD INDICATORS OF WETLAND/RIPARIAN HYDROLOGY RATING INDEX

**Objective:** This variable is a measure of the hydrologic regime based on observed field indicators for the subject wetland including hydroperiod duration and magnitude. Wetland hydrology is generally interpreted using vegetative indicators. In addition, the presence of aquatic fauna as well as hydrologic indicators such as lichen lines, algal mats, adventitious roots, basal scarring, drift lines, secondary flow channels, sediment deposition, and water marks are also utilized. Signs of altered hydrology may include encroachment of upland and transitional plant species into the wetland.

	<b>Score</b>
<b>HYDROLOGIC REGIME FAILING TO MAINTAIN A VIABLE WETLAND/RIPARIAN SYSTEM.</b>	<b>0</b>
<ul style="list-style-type: none"><li>• Hydroperiod inadequate to support target vegetation due to (circle one): (a) too much water or (b) too little water</li></ul>	
<b>HYDROLOGIC REGIME INADEQUATE TO MAINTAIN A VIABLE WETLAND/RIPARIAN SYSTEM</b>	<b>1</b>
<ul style="list-style-type: none"><li>• Hydroperiod minimally supports target vegetation. [JE: size and degree of channelization may be an issue in SFB marshes, especially when considering rail habitat]</li><li>• Succession of wetland plant species into transitional/upland plant species.</li><li>• Appropriate vegetation stressed or dying from too much or too little water.</li></ul>	
<b>HYDROLOGIC REGIME ADEQUATE TO MAINTAIN A VIABLE WETLAND/RIPARIAN SYSTEM.BUT POTENTIALLY THREATENED</b>	<b>2</b>
<ul style="list-style-type: none"><li>• Wetland hydroperiod adequately supports target vegetation but water source is subject to alteration</li><li>• Plant community healthy, although there may be some signs of compromised hydrology.</li></ul>	
<b>HYDROLOGIC REGIME ADEQUATE TO MAINTAIN A VIABLE WETLAND/RIPARIAN SYSTEM AND LIKELY TO REMAIN SO</b>	<b>3</b>
<ul style="list-style-type: none"><li>• Hydroperiod adequately supports target vegetation and water source reliable.</li><li>• Plants healthy with no stress resulting from an improper hydroperiod.</li><li>• Wetland not adjacent to canals, ditches, swales, berms, or other negative impacts to the wetland within the landscape setting.</li></ul>	

### 5. SURROUNDING LAND USE

Estimate amount by percent surrounding site, and multiply by score (add additional categories on field data sheet with appropriate scores)

The scores for land use types are as follows:

<u>LAND USE CATEGORY*</u>	SCORE
NATURAL AREAS:	
natural undeveloped areas	3
unimproved pasture / rangeland	2.5
RESIDENTIAL:	
low density residential	2
single-family residential	1.5
multi-family residential	1
COMMERICAL:	
low intensity commercial	2
institutional	2
high intensity commercial	0.5
moderately intensive commercial	1.5
FARMING:	
Agricultural (includes vineyards)	1
dairy and feedlot; horse stables	0
HIGHWAYS	
low volume highway	2
high volume highway	1
OTHER:	
recreational	1.5
golf course	1.5
industrial	1
mining	1



Field Notes:

1. Wildlife Use

2. Wetland Dominant Vegetation  
Cover

3. Habitat Support/Buffer

4. Field Hydrology

5. Surrounding Land Use

## **APPENDIX II**

Draft Final (still in progress).

**APPENDIX II: Completed Compliance and Wetland Ecological Assessments [WEAs] for 20 Projects Reviewed in the San Francisco Bay Region between March 18 through May 5, 2003: Sites 1 through 10.**

Notes to the reader:

- (1) Plant species in the following summaries are mentioned first by common and Latin names, and subsequently by common names only. Most plants mentioned in the summaries below are listed in Appendix VI. Some of the more threatening non-native plants are listed in Appendix VII.
- (2) For a complete lists of wildlife, see the following appendices: Appendix III, Birds; Appendix IV, Invertebrates; Appendix V, Mammals, Fish, Amphibians, and Reptiles (note Appendix V covers only species seen incidentally as a result of surveying directly for plants, birds, and invertebrates).
- (3) Approximately half the sites were evaluated by B. Pavlik, Ph.D. (BMP Ecosciences 2003). His descriptions are included here along with his scores labeled “C-S-R Ratings” corresponding to Composition (species identity and richness), Structure (architectural complexity); and Re-establishment (population trajectories) For a complete description of his scoring system, see Appendix I (B). Note that the order is reversed here from his original report to maintain a consistent arrangement of the numbers. In the summaries contained in this appendix, 3 is high; 2 is medium; and 1 is low. Both the site and the surrounding area (“context”) are ranked.

**Wetland Projects Included in Appendix II:**

<b>SITE NAME and Number</b>	<b>DATE VISITED (2003)</b>
1. Sonoma Baylands	March 18
2. City of Fairfield, Laurel Creek	March 18
3. Green Valley Creek	March 19
4. Paradise Valley	March 19
5. Richmond Parkway	March 20
6. Shell Refinery Unit X	March 20
7. Robert’s Landing (aka Heron Bay or Citation Homes)	March 27
8. Triangle Schnitzer	March 27
9. Mayhew Landing	March 27
10. Dublin Meadows	March 28
11. West Branch Alamo Creek	March 28
12. Bettencourt Detention Basin	March 28
13. Fleeman Property (aka Peabody Road)	April 7
14. Red Top	April 7
15. Pittman Road	April 7
16. Calera Creek Project (Pacifica Wastewater Treatment Plant)	April 9
17. Berlex Biosciences	April 10
18. Bay Point Corner Lot (aka Allied Signal or General Chemical)	April 10
19. Calabazas Creek (Santa Clara Valley Water District)	May 5
20. Coyote Creek (SCVWD)	May 5

Assessment Site # 1.

## I. GENERAL PROJECT INFORMATION

1. **Project Name:** SONOMA BAYLANDS
2. **Project Location:** Near Black Point, immediately northeast of the confluence of the Petaluma River and San Pablo Bay. South of Highway 37.  
Field GPS: 10S 0545096/ 4218816
3. **U.S. ACOE File No:** [none]
4. **SFB RWQCB File No:** WDID: 2 0549062; WDR Order # 93-081
5. **Wetland Type:** Tidal Wetland
6. **Project Size and Type:** Total area is 322 acres. Restoration of 289 acres of diked farmland to tidal marsh with impacts to 56 acres of seasonal marsh. Pilot Unit = 29 acres; Main Unit = 260 acres).
7. **Project Goals:**
  - 1) Restore a tidal salt marsh community on 289 acres of diked baylands within a period of 20 years from the restoration of tidal action
  - 2) Increase the acreage of suitable habitat for two endangered species, the Salt Marsh Harvest Mouse (SMHM) and the California clapper rail (CCR), within a period of 20 years from the restoration of tidal action.
8. **Project Description:** One of the largest wetland restoration projects of the 1990's in the San Francisco Bay Region, this project was to serve as a model for future restoration design. Estimated fill between 2.5-3.0 million cubic yards.
9. **Years of Required Monitoring:** 20 Years (or "until performance criteria are met" for some criteria.)
10. **Years of Monitoring Completed:** Pilot breached in 1/96; Main breached in 10/96. 2001 Monitoring Report states it was the sixth report.
11. **Project Permittee:** California Coastal Conservancy in cooperation with the U.S. Army Corps of Engineers (Project Managers); Sonoma Land Trust (Land Owner)
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Smith
13. **Wetland Assessment Date:** 3/18/03

## II. ECOLOGICAL WETLAND FUNCTION:

1. **Field Methods:** The 289-acre site was driven by car on a levee road and the project was assessed from three different areas, two in or above the main unit and one above the pilot unit. Vegetation was assessed from all three areas and one overall Wetland Ecological Evaluation (WEA) was scored for the site. The 3 vegetation locations covered the following: (1) at the main breach where about 75% of the main unit was visible; (2) at the northeast corner of the main unit which had about 50% overlap with #1; and (3) where about 100% of the pilot unit was visible.
2. **Site Description:** At site (1) at low tide, most of the site was covered by open water and mudflat with a less than 10% of the area covered by pickleweed (*Salicornia virginia*), gumplant (*Grindelia sp.*), the native California cord grass (*Spartina foliosa*), and coyote bush (*Baccharis pilularis*). At site (2) open water continued to predominate with a small amount of visible pickleweed and about 15% of the levee top showing ruderal upland vegetation. At site (3) at a relatively high tide, the pilot unit showed a similar composition as site (2) with mostly open water and mudflat, about 15% ruderal vegetation on the levees, approximately 15% pickleweed, and <1% California cord grass.
3. **WEA Scores:**
  - Wildlife = 3.
  - Vegetation = 1.5.
    - Herbaceous (< 1 Meter) [NA]

- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer = 3.

Hydrology = 2. [Note this has been changed from field assessment of 3.]

Surrounding Land Use = 2.6.

**TOTAL: 12.1**

### III. PERMIT COMPLIANCE:

This site has a large number of performance criteria, some of which are abbreviated below. Because monitoring reports were not submitted in advance of the field trip, some of the determinations of compliance made below were done with the contribution of the primary project consultant, Philip Williams.

#### A. PHYSICAL: [Note that status of performance criteria is bolded.]

1. Tidal channels will measurably erode.

**Yes, eroding, but pace is slower than anticipated?**

2. Within 5 years, mean tide range of both primary channels near the breaches will be at least 90% of the mean tide range in northern San Pablo Bay.

**No, not met. Pilot Unit is close but Main Unit is only 15-20% of what it should be.**

3. At least 90% of peninsula lengths will be below 4.0 feet NGVD...within 10 years.

**This criteria is not being met but there is high use by pelicans, geese, terns, cormorants, and ducks. The U.S. Fish and Wildlife Service would like these peninsulas modified or removed entirely to prevent predator access (Cay Goude, pers. comm., 5/12/03).**

4. Within 20 years, the density of channels will equal density in pre-project channels in existing marsh.

**The Pilot Unit is starting to see drainage unit but too early for Main Unit.**

#### B. BIOLOGICAL:

1. Tidal marsh vegetation will begin to establish in both units within 5 years.

**Yes, established along edges (= bathtub ring effect).**

2. At least 65% of entire restored area will have marsh vegetation within 20 years.

**Too early to judge.**

3. The total population of shorebirds, waterfowl, and other water birds will not be significantly less than densities at marsh and mudflat reference sites within 20 years.

**Shorebird density is higher than reference sites (?) and marsh bird densities may increase as the site becomes more vegetated. Still too early to judge completely.**

4. Estuarine fishes will not be significantly less than those of nearby reference marshes within 20 years.

**It is not clear whether fish monitoring has been carried out as required.**

**Surveys were conducted in 1997 and 2000 (?). Otherwise, it is still early for a complete assessment.**

5. A minimum of 3 pairs of California clapper rails (CCR) will be supported within 20 years.

**CCR source populations in the San Pablo Bay are deficient so there may be a problem populating the site even if the appropriate vegetation and channel networks are established. It is still too early for a complete assessment of this performance criteria. Note, however, that according to Dr. Peter Baye, the lack of tidal energy reaching the site is likely to prevent the development of CCR habitat because pickleweed will become established without a tidal channel network. Later when tidal energy should be adequate to form channels, the vegetation may be so entrenched and the surface so hard, that no channels are formed and consequently no CCR habitat is restored. He believes that the longer the site is allowed to**

**continue without inadequate channel sizes, the more likely it is that the channels may never develop.**

**Predator control is needed at this site if CCRs do inhabit it.**

6. A minimum of 28 acres of suitable SMHM (SMHM) habitat will be restored within 20 years.

**Pickleweed and native halophytes are becoming established. It is still too early to judge.**

Except for the first monitoring year (1996), this project has been consistently late or absent with monitoring reports as indicated by the table below.

Monitoring Reports due to the SFB RWQCB:

<b>Monitoring Reports due during construction and after the 1996 levee breaches:</b>	<b>Monitoring Reports received on Time</b>	<b>Late or Combined Reports:</b>
1996	Received 8/14/96	
1997	??	??
1998		1997-1998 Monitoring Report was received 1/4/2000
1999		Received 3/11/03
2000		Received 3/11/03
2001 Final Annual Monitoring Report #6.		Received 3/11/03
2002		Not received yet.
2003		In progress?

#### **IV. WETLAND LOSS OR GAIN:**

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted = 56 acres and Restored = 289 acres.** This site is functioning well for shorebirds and waterfowl but it is too early to tell whether performance criteria for endangered species will be met. Determine the value to CCRs and SMHM of the 56 acres of seasonal wetlands. If there was not any, consider this a gain of 233 acres.

#### **V. RECOMMENDATIONS:**

1. Consider widening both channels, especially to the Main Unit, to assure that sufficient tidal energy reaches the entire site and forms the channels necessary to provide habitat for the CCR and the tidal marsh vegetation required by the SMHM for survival.
2. Begin a trapping program for CCR and SMHM predators (red fox, skunk, raccoon, and possibly feral cats).
3. Reduce predator access to the peninsulas (the “wind fetch areas”).
4. Consider removing eucalyptus trees which provide habitat for predators of CCR such as great horned owls and barn owls (note, but owls are native species but may hinder project success).
5. Remove invasive non-native species on the levees and peninsulas (e.g., yellow starthistle (*Centaurea solstitialis*). Ruderal vegetation on levees at the time of the site assessment included wild radish (*Raphanus*

*sativa*), fennel (*Foeniculum vulgare*), broadleaf peppergrass (*Lepidium latifolium*), curly dock (*Rumex crispus*), and various non-native grasses.

6. Consider convening a panel of agencies and interested parties to review monitoring reports and site assessments and to recommend appropriate future activities. This restoration site is very important to the San Francisco Bay Region both because of its large size and because of the abundance of monitoring data. Interpretation of this data, however, varies and crucial decisions need to be taken about whether or not to leave the site to continue its slow evolution or to speed up the process toward tidal marsh development by enlarging the main channels.

7. Consider a permanent funding source for data collection and analysis. The consultant has said that funding comes in fits and starts and, while most required data has been collected, it has not all been analyzed. An analysis of all monitoring data since breaching both units in 1996, would be useful for decision makers.

8. Annual monitoring reports should be provided to all interested parties each year (as required in the permit) or an agreement made with the permitting agencies to allow two years of data to be combined. Monitoring reports have not been submitted each year.

**Wetland Ecological Assessment Form for SF Bay Wetland Restoration Projects  
(Spring 2003)**

**Check one or two:**

Mitigation Project                      Existing Condition X                      Proposed Condition

[Note: This is a Restoration project with mitigation expected for seasonal wetland loss]

Project Name:                      Corps Ap. #:                      RWQCB WDID #: 2 0549062  

SONOMA BAYLANDS		WDR Order #: 93-081
		RWQCB File #s: 1535.05 & 1556.00

Assessment Date:                      Evaluators:                      Wetland Types(s):  

3/18/03	BreauX, Martindale, Evans, Cochrane, Smith	Mudflat, Tidal.
---------	--	-----------------

Assessment Time:                      Project Age (since breach, fill, completed construction, etc.):  

9:30 am - 12:15 pm	Pilot Unit Breached: 1/96 = 7 years old Main Unit Breached: 10/96 = 6 years old
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Wetland Acreage (100 acre recommended maximum):                      GPS Coordinates:  

322 Acres	10S 0545096/ 4218816	
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**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	3 * 65%	1.95
Unimproved pasture/rangeland	2.5 * 20%	0.5
Low intensity commercial (marina)	2 * 2%	0.13
Improved pasture	1 * 13%	0.04
LU Total		2.62

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	3	3
2. Dominant Vegetation Cover	1.5	3
3. Buffer/Upland	3	3
4. Wetland Hydrology	2*	3
5. Surrounding Land Use	2.6	3
<b>TOTAL FINAL SCORE</b>	<b>12.1</b>	<b>15</b>

\*Note that hydrology needs further evaluation

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use** (For a complete list see Wildlife Appendices.)

Wildlife Use is rated as high primarily because of high shorebird and waterfowl use in addition to observation of raptors, fish, small and medium sized mammals, and invertebrates. Assessment was conducted during both a high and a low tide providing conditions for high shorebird activity. Monitoring reports were late and thus not read before the assessment, but one of the members of the Bay Area Assessment Team has been, coincidentally the bird monitor for this site and is thus very familiar with it.

It is important to note that the Sonoma Baylands' site is meant to develop as habitat for CCR as well as shorebirds and waterfowl, so progress towards development of its habitat needs to be evaluated immediately.

Digging a deeper channel to the Main Unit may be necessary and should be discussed with the U.S. Fish & Wildlife Service

If subsequent assessments find only shorebirds and waterfowl and no CCR and SMHM, the wildlife score should be lowered.

**2. Wetland Dominant Vegetation**

**Cover**

Mostly open water and tidal flat that provides excellent habitat for shorebirds & waterfowl. Peripheral tidal vegetation borders are developing nicely.

Vegetation development is a little slower than expected, probably due to tidal channels that are too small. Site may be developing too slowly to benefit the endangered CA Clapper Rail whose populations have been severely depleted in this region of the SF Bay due, most likely, to predation by the non-native species of the red fox (Jules Evans, pers. comm).

**3. Habitat Support/Buffer**

Site has a buffer greater than 300 feet wide, is contiguous to an existing wetland system and, except for some of the levees, contains mostly native species. Well buffered all around in terms of land use. Lots of open space and low human use. A very large marsh surrounded by some agricultural lands.

**4. Field Hydrology**

This score is based on the likelihood that the wetland will maintain a reliable hydrologic source for the long-term future. In this sense, the tidal wetland scored high. On the other hand, because the channel development is slower than anticipated which is likely to lead to slower or no development for the CCR, the score has been lowered from a 3 (=high) to a 2 (= medium) so that the feasibility of digger a deeper channel can be investigated.

[Potential for complete hydrologic failure discussed with Cay Goude (US FWS) and Peter Baye.]

**5. Surrounding Land Use (SLU)**

The SLUs are mostly natural undeveloped areas or areas with improved pasture or open space. These are considered beneficial to wetland sites. There are reportedly plans to develop some of the SLU to a casino.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 2

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Laurel Creek, City of Fairfield
2. **Project Location:** Laurel Creek from 660 southwest of Sunset Ave to Pacific railroad right-of-way, City of Fairfield, Solano County.  
GPS = 10S 0585528/ 4235248.
3. **U.S. ACOE File Number:** 18627E95
4. **SFB RWQCB File No.:** WDID # 2 0348051
5. **Wetland Type:** Seasonal/Riparian
6. **Project Size and Type:** Mitigation enhancement of 1.3 acres of seasonal/riparian habitat.
7. **Project Goals:**
  - a) Enhance the existing plant palette and create a seasonal riparian community with dry canyon banks in a section of the creek immediately upstream of the Project.
  - b) Establish a viable plant community and an enhanced wildlife habitat for the birds and small mammals that utilize this corridor. Also, improve the aesthetic and recreational values of the area and provide a degree of erosion control.
  - c) a mature plant community will be provided by this plan within the next 7-15 years.
8. **Project Description:** Enhancement for impacts to Laurel Creek resulting from culverts in an area south of Sunset Court and ending at Railroad Ave. Impact project length was 2700 feet and total wetland fill was 0.83 acres.
9. **Years of Required Monitoring:** 5 Years
10. **Years of Monitoring Completed:** 5
11. **Project Permittee:** Charles Beck, City Engineer
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Smith
13. **Wetland Assessment Date:** 3/18/03

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

This small site has an asphalt path running along side Laurel Creek, which made access easy. We walked the full length of the site observing vegetation, vertebrates, and invertebrates.

### 2. Site Description:

At the time of the site visit and from the point of observation where most of the site was visible, the vegetation was stratified into the following approximate cover:

- 55% herbaceous layer including cattails (*Typha* sp.), *Scirpus* sp., roses (*Rosa* sp.), and golden current (*Ribes aureum* var. *gracillimum*);
- 45% middle shrub layer including flannel bush (*Fremontodendron californicum*), red bud (*Cercis occidentalis*), ceanothus (*Ceanothus* sp.), and more golden current; and
- 5% canopy cover of mostly valley oak (*Quercus lobata*).

The site is somewhat small and degraded but some planted vegetation, especially in the shrub layer, is doing well and likely to provide a small amount of wildlife habitat.

Invasive species that may pose a future problem include: broadleaf peppergrass, giant reed (*Arundo donax*) (in the creek adjacent to the site), and hairy and smooth pampas grass (*Cortaderia jubata/selloana*).

### 3. WEA Scores:

Wildlife = 1

Vegetation = 1.6

- Herbaceous (< 1 Meter) [NA]
- Shrub (1-3 Meters) [NA]

- Trees (> 3 Meters) [NA]

Buffer = 1

Hydrology = 2

Surrounding Land Use = 1.5

**TOTAL: 7.1**

### III. PERMIT COMPLIANCE:

1. Plant 1.3 acres of riparian habitat along same channel, upstream of impacts
2. 90% cover of smaller plants by Year 5-7
3. “Larger” plants should reach full growth by Year 7-15
4. 3 Canopy Levels: low shrubs 2-10 ft. tall; tall shrubs 7-20 ft. tall; and trees 15-30 ft tall.
5. Water from storm drain runoff and localized rainfall will be sufficient to support mitigation.

The wetlands are partly but not completely developing as planned. A more developed overstory was expected based on the original planting list which included oaks (*Quercus* sp.), buckeye (*Aesulus californica*), and California Bay Laurel (*Umbellularia californica*). No Corps sign-off has occurred.

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 0.8 Acres and 1.3 Acres Enhanced**. Note that enhancement is not generally considered a gain in the “no-net-loss” scheme for wetlands. This site would therefore be considered a loss based on quantity of wetland acres lost. The overall quality of the mitigation enhancement project is partially, but not completely successful.

### V. RECOMMENDATIONS:

1. Remove the non-native species listed above under Section II (2)
2. Some trees appear to be dead from spraying. This could have been done by one isolated home owner, but if the city or county is spraying, it should stop.
3. This riparian corridor would be more functional with a greater shade canopy. This may develop over the years as some of the shrubs increase in height and vertical complexity.

WEA FORM

<b>Wetland Ecological Assessment for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
Site #: 2		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB Ap #:
Laurel Creek, City of Fairfield	18627 E 95	2 0348051

Assessment Date:	Evaluators:	Wetland Types(s):
3/18/03	Breaux, Martindale, Evans, Cochrane, Smith	Seasonal? / Riparian

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
2-4 p.m.	1992

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
1.3 Acres Enhanced	10S 0585528/ 4235248

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area		
Unimproved pasture/rangeland		
Low intensity commercial (marina)		
Improved pasture		
Single family residential	1.5 x 100%	1.5
	LU Total	1.5

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	1	3
2. Dominant Vegetation Cover*	1.6	3
(< 1 meter)	[2]	[3]
(1-3 meters)	[2]	[3]
(> 3 meters)	[1]	[3]
3. Buffer/Upland	1	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	1.5	3
<b>TOTAL FINAL SCORE</b>	<b>7.1</b>	<b>15</b>

\*Add all 3 strata and divide by number of categories used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use (For a complete list, see Wildlife and Plant Appendices.)**

The site shows minimal evidence of native wildlife use or opportunity for use because of its small size, low canopy cover, and location in a housing development. Still, the well-developed shrub cover is probably good for migratory birds and for insects. While the value for wildlife was rated as minimal compared to a natural system, this site does provide some habitat compared to the surrounding area.

Hummingbirds, (Allen + Anna's), morning doves, robins, dark-eyed junco, butterflies (Hair Streak?), house finch, American crow, crawfish, mosquito fish or minnows, waterboatman, hydrophilid beetle, flies, wasps, hemipteran, leaf hoppers, spiders, midges.

**2. Wetland Dominant Vegetation Cover**

Riparian area is developing but upper story canopy is lacking. Small shrubs are doing well, but not overstory.

Dense cattails and *Scirpus* are crowding the creek. More canopy cover and less herbaceous grasses might provide more valuable habitat for aquatic fauna.

Planted or retained successful natives: flannel bush, red bud, golden current, wild rose, toyon, valley oak (one was mostly dead), elderberry

Invasives: broadleaf pepper grass, pampas grass, giant reed, non-native grasses (wild oat-*Avena* sp., and ripgut grass- *Bromus diandrus*), curly dock, cutleaf geranium (*Geranium dissectum*)

This site is degraded habitat but the planted native shrubs do provide some value.

**3. Habitat Support/Buffer**

The buffer is less than 30 feet but does contain some desirable shrubs that provide habitat for wildlife.

**4. Hydrology**

Rated as probably reliable for continued hydrologic source.

Cattails and scirpus indicate that water supply is present. Site might receive some stormwater from streets.

**5. Surrounding Land Use**

Rated as poor due to lack of natural area.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 3

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Green Valley Creek
2. **Project Location:** Northwest of I-80 within the city of Fairfield Solano County. Along Green Valley Creek off Green Valley Road.  
Lat: 38° 13' 03" N, Long: 122°08'33".  
Field GPS: 10S 0574252/ 4231225. Elevation 64 ft.
3. **U.S. ACOE File Number:** 17455N
4. **SFB RWQCB File No.:** WDID 2 0348050
5. **Wetland Type:** Riparian & Grassland
6. **Project Size and Type:** Creation of 10 acres of riparian and 4 acres of seasonal/fresh wetland. Planting 13 acres of upland. Some oaks preserved along creek.
7. **Project Goals:**
  - a) maintain and restore riparian and other wetland values of Green Valley Creek
  - b) provide for safe conveyance of flood waters
  - c) provide mitigation for the fill of 5.4 acres of Corps jurisdictional areas.
8. **Project Description:** Restoration and preservation project to compensate for impacts to 3.7 acres of waters of the U.S. and 1.8 acres of seasonal/fresh marsh that were filled for the adjacent Four Seasons development. Portions of the existing riparian corridor were preserved and native riparian vegetation was planted on both sides of creek. An overflow terrace was constructed to carry flood waters.
9. **Years of Required Monitoring:** 10 Years
10. **Years of Monitoring Completed:** 9 in 2003?
11. **Project Permittee:** City of Fairfield
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale.
13. **Wetland Assessment Date:** 3/19/03 (9:30 am -- 2 pm). (Note: about 0.5 miles [?] of the project's creek length was walked but the actual assessment covered only a small portion of this fairly long riparian creek restoration project. Given the length of the site, this single assessment should not be thought of as representative of the entire site. This mitigation site was only one of three that comprised the entire mitigation project. [?]).

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

About 50% of the site was walked (?) before conducting the assessment from a vantage point from which only about 10% of the entire project area could be seen. The assessment point was, however, fairly representative of the portion walked. Additional vegetation observed is noted below.

One other area of the creek was briefly observed at the bridge where beavers had changed the area from a riparian to an emergent wetland area but no assessment was conducted here due to a lack of time.

2. **Site Evaluation Description:** The riparian corridor and grassland area broke down into the following rough approximations:

- 7% open water in the channel;
- 13% upperstory canopy dominated by valley oaks, ash (*Fraxinus* sp.), and alders (*Alnus* sp.);
- 10% middle shrub layer dominated by coyote bush, willow (*Salix* sp.), and toyon (*Heteromeles arbutifolia*); and
- 70% divided into herbs and grasses with at least 25% native species including creeping wild rye (*Leymus triticoides*) and cattails (*Typha* sp.). Non-native species included grasses, vetch (*Vicia sativa*), and small amounts of fennel, poison hemlock (*Conium maculatum*), periwinkle

(*Vinca major*), and Himalayan berry (*Rubus discolor*) which could become a problem in the future.

Additional vegetation observed included sedge (*Carex* sp.), mugwort (*Artemisia* sp.), curly dock, wild radish, and cutleaf geranium.

### 3. WEA Scores:

Wildlife = 2.5

Vegetation = 1.7

- Herbaceous (< 1 Meter) [1]
- Shrub (1-3 Meters) [1]
- Trees (> 3 Meters) [3]

Buffer = 2

Hydrology = 2

Surrounding Land Use = 1.7

**TOTAL: 9.9**

### III. PERMIT COMPLIANCE:

[Plant vigor categories are: Class 1 – vigorous growth, no die-back of crown, relative absence of insect or other infestations. Class 2 – moderate to strong vigor, no die-back, and minimal infestations. Class 3 – poor to no vigor, die-back of crown, large to extensive infestations.]

1. Channel stability
  - a. incipient erosion prevented and severe erosion corrected
2. Riparian and oak woodland
  - a. Water-stress measurements comparable to control sites
  - b. Plant vigor Class 2 or better
  - c. Species diversity as shown in planting plan
  - d. 70 % native cover at Year Five.
  - e. 80 % survival of trees and shrubs at Year Five
  - f.

[Note that a few other performance criteria are listed in the field sheets compiled for this project, and those criteria will be further investigated and clarified by the U.S. ACOE. See pages 66 and 67 of mitigation plan.]

Most of the performance criteria appear to be met, but the project was not yet completed at the time of the site visit. An exception is the requirement that the site have 80% relative cover of native grass species, which is not being met, but that may have been an unrealistically high performance criteria that cannot be achieved.

Some culverts are blocked, indicating a failure of underground culverts to adequately transport sediment but that is not a compliance issue. The creek should have been left above ground with an adequate flood plain.

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted = 5.4 acres and 14 created.** If final monitoring report is approved after Year 10, then the total gain will be 2.5 acres gained for each acre lost (Also note 13 acres of upland planted and preserved. Do not include in calculations as a gain but it is important as buffer and grassland for this site.)

### V. RECOMMENDATIONS:

1. Remove invasive non-natives particularly periwinkle, poison hemlock, and fennel.
2. Consider planting more native shrubs along creek and planting willows in the flood plain to promote wildlife habitat for amphibians, reptiles, birds, mammals, and insects.
3. For the small part of this project where the creek is underground, consider bringing it above ground. (Note that for most of the site the creek is above ground and functioning well.)

WEA FORM  
Site #: 3

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Green Valley Creek	17455N	2 0348050

Assessment Date:	Evaluators:	Wetland Types(s):
3/19/03	Breaux, Martindale, Evans, Cochrane	Riparian & Grassland

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
9:30 am -- 2:00 pm	9 Years (Final 10th Monitoring over in 2004.)

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
10 acres riparian; 4 acres seasonal; & 13 acres uplands	10S 0574252/ 4231225

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Single family residential	75% * 1.5	1.1
Low volume highway	15% * 2	0.3
Unimproved pasture/rangeland	10% * 2.5	0.25
	LU Total	1.7

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2.5	3
2. Dominant Vegetation Cover* (< 1 meter)	1.7	3
(1-3 meters)	[1]	[3]
(> 3 meters)	[1]	[3]
3. Buffer/Upland	[3]	[3]
4. Wetland Hydrology	2	3
5. Surrounding Land Use	2	3
	1.7	3
<b>TOTAL FINAL SCORE</b>	<b>9.9</b>	<b>15</b>

\*Add all 3 strata and divide by the number of categories used for Dominant

## Vegetation Cover.

**FIELD & FOLLOW UP NOTES:** (For a complete list, see Wildlife and Plant Appendices)

### 1. Wildlife Use (For a complete list, see Wildlife Appendices).

This site appears to provide excellent wildlife habitat, but the houses are very close to the site.

Still, the observation of about 18 Sacramento suckers in the creek (a special status species) give this site a relatively high ranking for wildlife. Other species observed include the following:

black phoebe, lesser goldfinch, titmouse, yellow rumped warbler, red-winged blackbird, and numerous other passerines and raptors; invertebrates included stoneflies, midges, and water striders; amphibian eggs; western fence lizards; mole burrows and racoon and skunk tracks.

Potential problem species include the turkey.

Note that an assessment conducted a month or so later in April or May would probably show more birds, amphibians and reptiles.

### 2. Wetland Dominant Vegetation

#### Cover

Native tree canopy cover is excellent, but the native understory shrubs and grasses are not as developed as they might be.

Non-native invasives include vinca, poison hemlock, and fennel.

### 3. Habitat Support/Buffer

Excellent buffer of between 30 and 300 feet for the riparian corridor but no buffer for the whole site. The seasonal wetlands and grasslands have a small buffer on one side but generally good buffers on the other 3 sides.

### 4. Hydrology

The site is likely to maintain a viable hydrologic source though it is possible that the tributary sources will become blocked, leading to erosion and unstable banks. Some of the culverts upstream of this assessment site on Henesey Creek (sp?) are completely blocked with sediment. That design used underground pipes to carry water which apparently is not working well.

A few eroding banks visible but erosion not currently excessive.

### 5. Surrounding Land Use (SLU)

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 4

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Paradise Valley Development Project
2. **Project Location:** Project located on a 9.7 acre property which includes open oak savanna, a portion of Laurel Creek.  
Field GPS: 10S 0584541 UTM4240711. Altitude: 192 ft.  
Location is east of Hwy 80 in the vicinity of Dover Ave. and Paradise Valley Rd in the City of Fairfield, Ca. Within the Foothills of the Vaca Mtns, in Solano County. Two major creeks flow through the Site: Soda Springs and Laurel Creek. Soda Springs converges with Laurel Creek at the south end of the site.
3. **U.S. ACOE File Number:** 17248N95
4. **SFB RWQCB File No.:** WDID 2 034 8066
5. **Wetland Type:** Seasonal/permanent freshwater ponds.
6. **Project Size and Type:** 3 Acres of seasonal/freshwater ponds created by damming portions of Laurel Creek.
7. **Project Goals:**
  - (a) Replace the wildlife habitat values lost by filling the 3.06 acres of wetlands on site.
  - (b) Create 3.06 acres of new wetland area along Laurel Creek to replace those wetlands filled on an acre-for-acre basis.
  - (c) Additional tree plantings may be necessary to fully comply with recommended tree replacement ratios.
  - (d) Conduct all necessary compensation efforts on project site with monitoring and remedial actions. Project sponsor agrees to purchase Reach 3 of Laurel Creek as compensation site.
8. **Project Description:**

Excavation of creekside lands and placement of multiple check dams along creek to create approximately 3.06 acres of impoundment are to comprise the "compensation area". Mitigation consists of small rock dam structures within creek channel and excavation behind the rock dams to the level of the channel bottom. This will expand the riparian habitat acreage and create backwater pooling areas.
9. **Years of Required Monitoring:** 5 Years
10. **Years of Monitoring Completed:** [The only monitoring report found at U.S. ACOE office in San Francisco was for 1993, though there is mention of a 1995 report that states that the project was in compliance with performance criteria.]
11. **Project Permittee:** Wincrest Homes, Inc.
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale
13. **Wetland Assessment Date:** 3/19/03

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

This site was walked starting from the downstream, riparian area and progressing upstream to the six mitigation wetlands formed by damming the creek to form freshwater wetlands. One assessment was conducted toward the upstream end of the site where only about 5% of the entire site could be seen. [On the project site map this area was named "D1" for the first dam site.] Additional data was collected from a vegetation transect and from invertebrate sweeps.

### 2. Site Evaluation Description:

Oaks, cottonwoods, and willows form most of the upper story canopy at this site. From the point of our assessment the relative vegetation cover approximated the following:

- 10% open water and 1% unvegetated ground;
- 10% oak canopy;
- 14% middle stratum mostly of coyote bush, red bud, elderberry, and willows;
- 65% lower stratum with about 32% cattails and scirpus and the remaining 33% consisting of fennel, broadleaf peppergrass, blackberry, wild radish, vetch, geranium, bristly ox-tongue (*Picris echioides*), and non-native grasses.

In addition to some of these species, the transects contained curly dock and Italian thistle.

### 3. WEA Scores:

Wildlife = 2

Vegetation = 2 (the average of 3 layers below)

- Herbaceous (< 1 Meter) [2]
- Shrub (1-3 Meters) [2]
- Trees (> 3 Meters) [2]

Buffer = 2

Hydrology = 1.5

Surrounding Land Use = 1.6

**TOTAL: 9.1**

### III. PERMIT COMPLIANCE:

Criteria:

1. Create 3.1 acres of wetlands
2. 50% survival of plantings
3. Species diversity index of mitigation reach of creek should increase from 1.38 to 2.15.

These performance criteria appear to have been met but the project has not been signed off yet by the U.S. ACOE. (A requirement for native species should have been required for this project but was not.)

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted = 3.0 and Created = 3.0.**

It appears that this site had no additional mitigation for the temporal loss or the high risk of this type of project. It also appears that there has been no control of invasive exotic species. While the site is located on 9.7 acres, it appears that only 3 acres of wetland were created for the 3 acres lost. This would probably not be acceptable today, especially since the new wetlands were actually formed by altering the hydrology of existing wetlands. So, while this site may have some ecological value as shown from its WEA scores, it basically contributed nothing to the net gain of wetland function and probably represented an overall loss.

### V. RECOMMENDATIONS:

1. Do not dam existing creeks to create wetlands since the integrity of the creek may be compromised.
2. Remove non-native invasive species, especially broadleaf peppergrass and fennel.

WEA FORM  
 Site #: 4

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Paradise Valley Development Project	17248N95	2 0348066

Assessment Date:	Evaluators:	Wetland Types(s):
3/19/03	Breaux, Martindale, Evans, Cochrane	Seasonal/permanent freshwater ponds

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
2 pm to 4 pm	1991 (but replanting took place)

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
3 acres	10S 0584541/ UTM 4240711

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Single family residential	33% * 1.5	0.5
Unimproved pasture/rangeland	33% * 2.5	0.8
High volume highway	33% * 1	0.3
	LU Total	1.6

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover*	2	3
( < 1 meter)	[2]	[3]
( 1-3 meters)	[2]	[3]
( > 3 meters)	[2]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	1.5	3
5. Surrounding Land Use	1.6	3
<b>TOTAL FINAL SCORE</b>	<b>9.1</b>	<b>15</b>

**\*Add all 3 strata and divide by number of categories used for Dominant Vegetation Cover.**

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see Wildlife Appendices)

Habitat structure appears adequate for native wildlife though the season was not appropriate for migratory birds (better in April or May). Birds observed on site included black phoebe, bushtit, nuttall woodpeckers, song sparrow, northern flicker, ruby-crowned kinglet, and American goldfinch.

Invertebrates included snails, water boatman, damsel & dragon fly larvae, pardalis blue butterfly.

Also observed was a frog and deer tracks.

2. Wetland Dominant Vegetation Cover

This site has good oak overstory.

The middle stratum of vegetation includes coyote bush, red bud, elderberry, and willow. The herbaceous layer has some natives (e.g., cattails and scirpus) but also non-natives including broadleaved peppergrass, fennel, radish, vetch, geranium, bristly ox-tongue, and some grasses.

3. Habitat Support/Buffer

Lots of noise from highway but open space surrounds the site.

4. Hydrology

It is difficult to assess the hydrology for the entire site, since the assessment took place at only one area, and some seasonal wetlands are functioning while others do not appear to be. Some of the wetlands with cattails and *Scirpus* appear to have adequate hydrology, but some are filled with broadleaf peppergrass, indicating that the area may not be as wet as it should be.

5. Surrounding Land Use (SLU)

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 5

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Richmond Parkway
2. **Project Location:** On the south shore of San Pablo Bay at the end of Freethy Blvd. and Goodrick Ave., Richmond, CA.  
Lat/Long: 37°58'40"/ 122°21'30"  
Field GPS: 10S 0555107/ 4203095
3. **U.S. ACOE File Number:** 19105E76
4. **SFB RWQCB File No:** WDID 2 0307059
5. **Wetland Type:** Tidal marsh
6. **Project Size and Type:** 2.6 acres of restored tidal marsh to compensate for impacts to 2.6 acres of impacts to U.S. waters and various types of wetlands to build roads. New marsh habitat will be buffered by a 100 foot wide strip of upland grassland.
7. **Project Goals:** To replace functions of wetlands filled by creating tidal salt marsh at 1:1 ratio or greater.
8. **Project Description:** The mitigation marsh is located between two high quality existing tidal marshes. The mitigation site was backfilled to an elevation of 2.5 feet NGVD to allow natural accretion to raise the elevation to that of the adjacent marsh plain which is between 3.0 to 3.8 feet NGVD. Artificially constructed channels were also placed in the mitigation site.
9. **Years of Required Monitoring:** 5 Years or until performance criteria are met, whichever is longest.
10. **Years of Monitoring Completed:** 2 (project age is 7 Years at time of site evaluation).
11. **Project Permittee:** City of Richmond, Dept. of Public Works
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Pavlik. Steve Granholm, project consultant from LSA & Associates met us at the project site and provided background information. A separate assessment was conducted by Lynn Suer on 5/11/03 to determine the similarity of scores from different assessors.
13. **Wetland Assessment Date:** March 20, 2003

## II. ECOLOGICAL WETLAND FUNCTION:

This site is the first of several that has two additional pieces of information which are not included in all of the 20 assessments. The first is an additional WEA score provided by Dr. Lynn Suer who served as an outside evaluator and was not a member of the WEA team nor did she have knowledge of the WEA Team's scores (her scores are included under # 4 below). The second additional information is a Botanical Evaluation written by Dr. Bruce Pavlik of BMP Ecosciences (included under # 5 below).

### 1. Field Methods:

Field assessment from the WEA Team consisted of walking portions of the perimeter of the site (those that were safe to access), running some transects through the marsh or generally inspecting vegetation on the site, and conducting one assessment from a boardwalk running through the mitigation site. Approximately 100% of the 2.6 acre site could be seen from this vantage point.

### 2. Site Evaluation Description

At the time of the assessment, vegetation observed included the following (complete or more complete lists are provided under #5 below): 5% open water; 3% mudflat or bare channel; and 92% tidal marsh vegetation. Of that 92% approximately 40% was pickleweed, 33% fleshy jaumea (*Jaumea carnosa*), 10% California cord grass, 10% gumplant, salt grass (*Distichlis spicata*), and *Scirpus*, and the remaining 1% was cattails and alkali-heath (*Frankenia salina*)

While the surrounding edge is not officially the responsibility of this project, the non-native invasive species such should be removed, with particular attention to broadleaf peppergrass fennel and Scotch broom (*Cytisus scoparius*).

### 3. WEA Scores from Project Team :

Wildlife = 2

Vegetation = 3

- Herbaceous (< 1 Meter) [NA]
- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer = 2

Hydrology = 3

Surrounding Land Use = 2.2

**TOTAL: 12.2**

### 4. WEA Scores from Outside Evaluator:

Wildlife = 2

Vegetation = 3

- Herbaceous (< 1 Meter) [3]
- Shrub (1-3 Meters) [3]
- Trees (> 3 Meters) [NA]

Buffer = 2.6

Hydrology = 3

Surrounding Land Use = 1.7

**TOTAL: 12.3**

### 5. Additional Evaluation of Richmond Parkway provided by Bruce Pavlik, Ph.D., BMP Ecosciences:

C-S-R Ratings: Tidal Marsh = 3-3-3; Context = 1-1-1

**Evaluation Method:** Two transects were walked and plant species/vegetation characteristics observed. One transect was across the northeast portion of the marsh, with access afforded by a plank walkway beneath the PGE powerlines. The plank walkway was left to cherrystem into a portion of the interior. The other transect was along the northern marsh-upland ecotone, with access provided by the elevated berm. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by Dr. Steve Granholm, who was involved with the project at LSA of Richmond, CA.

**Project Description:** A 2.71 acre tidal marsh creation performed in September 1996 by LSA (consultants to the city of Richmond). The area is adjacent to a large, natural saltmarsh that provided the model (vegetation, hydrology) for the area to be converted from upland fill. Approximately 2' of relatively clean fill (some oil contamination present) was excavated and later used to construct the nearly parkway. A new layer of Clearlake Clay was spread out so that the new soil surface would be about 1' below the adjacent, natural soil level. This would keep water flowing into the areas of the new marsh that were distant from the bay along an artificial central channel. A dike was needed to keep water out during excavation, which was later removed when the artificial channel was connected to the nearby natural slough. Natural tidal action appears to be sufficient to bring water to the most interior edge of the created marsh. Storm surge may also raise the water level even higher, judging from the flotsam deposited above the marsh on the upland berm. Cost of the project was approximately 2 million dollars.

Propagules for marsh vegetation came into the area on their own, developing a nearly uniform, extensive cover within the first two years. During the 2003 evaluation, the saltmarsh vegetation of the created marsh was almost indistinguishable from that of the adjacent, natural marsh. It had a lighter color and was not quite as dense (perhaps 70-110% absolute cover, vs. 90-120+%), but for all intents and purposes it had natural patterning (i.e. species distributions, patchiness) and was dominated entirely by native species.

Adjacent upland areas were covered by weedy annual grasses and forbs (mostly non-native) that were either being invaded by scotch broom or supported naturalized populations of ornamental trees and shrubs. There was much trash and debris scattered around, with evidence of a homeless encampment, in the upland areas.

#### **Plant Species Observed in the Created Marsh:**

Salt grass – sparse, uncommon, but widespread across the created site

Alkali-heath – dense, in small patches near the upland edge

Gumplant (*Grindelia hirsutula*) – in small patches in open clay along levees, channels, marsh-upland ecotone (where 600 plugs were planted during the original project and only 9 survived in 2003)

Fleshy jaumea – dense, in patches or swards within the pickleweed or scattered

Pickleweed – dense, matted, monodominant in patches, across most of the created site

Robust bulrush (*Scirpus robustus*) – dense, in small patches near the upland edge or scattered

California cord grass – sparse, along lowest elevations in the artificial channel and in patches near the natural marsh

Broadleaf cattails (*Typha latifolia*) – dense, in small patches near the upland edge

#### **Plant Species Observed in Adjacent Areas (incomplete):**

Wild oats (*Avena fatua*) – non-native annual grass on upland berm

Coyote bush – native shrub on upland berm

Field mustard (*Brassica rapa*) – non-native annual on upland berm

Hottentot-fig ice plant (*Carpobrotus edulis*) – non-native prostrate shrub invading wetland edge – should be controlled

Scotch broom – non-native invasive shrub on upland berm - noxious weed that should be controlled

Fennel – non-native invasive perennial herb on upland berm – noxious weed that should be controlled

Italian rye grass (*Lolium multiflorum*) – non-native annual grass on upland berm

Milk thistle (*Silybum marianum*) – non-native biennial forb

Vetch – non-native annual forb on upland berm

**Vegetation Quality:** High quality, immature tidal marsh was created in the project area that closely resembled the adjacent natural marsh. Absolute cover by pickleweed was high (75-90+ %), interrupted by large patches of fleshy jaumea, salt grass, and California cord grass with almost no cover by non-native species. Adjacent uplands, however, were weedy and unmangaged and would act as sources of potentially invasive species if changes in marsh hydrology and sediment levels occurred.

**Recommendations:** Invasive, non-native plants in adjacent areas should be controlled, if not eliminated, to improve habitat quality at the edge of the marsh. Planting with coyote bush could provide more native cover.

**Overall Evaluation:** Project met permit conditions and produced valuable vegetation that enhances local biological resources.

### III. PERMIT COMPLIANCE:

Criteria (5 years):

1. 2.6 acres of salt marsh will be restored
2. 1.8 acres of marsh will be more than 100 yards away from Richmond Parkway road surface
3. at least 1.8 acres will have 80% vegetative cover (60% pickleweed) and average 12" in height.
4. transition zone will be dominated by salt marsh species, including but not limited to pickleweed, alkali heath, and/or gumplant
5. full circulation in restored marsh with inundation frequency and duration comparable to the surrounding natural marsh

Status:

Criteria met by year two.

Qualifies for Corps sign-off; Corps never sent a sign-off letter.

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted = 2.6 and Restored = 2.6.**

Given the high quality of the final wetland and its contribution to the regional landscape, this project is considered a net gain in quality (but not quantity). This is based on the assumption that the original acres that were lost were of poor quality.

### V. WEA Team RECOMMENDATIONS:

1. Control the non-native invasive species along the upland area surrounding the tidal marsh mitigation area before they get worse. Pay particular attention to peppergrass, fennel, and broom.
2. Plant coyote bush.
3. This site scored very high which was the result of excellent planning in terms of linking existing high quality wetlands through a mitigation project, as well as providing the right amount of engineering (e.g., elevations and minimal but important artificial channels). Still, allowing only 2 years of monitoring in a 5 year monitoring program should be avoided since many projects are not this effective in achieving their goals.
4. A higher ratio should typically be required to compensate for wetland losses.

WEA FORM

Site #: 5

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Richmond Parkway	19105 E 76	2 0307059

Assessment Date:	Evaluators:	Wetland Types(s):
3/20/03	Breaux, Martindale, Evans, Cochrane, Pavlik	Tidal Marsh

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
9:15 -- 11:00 am	7 Years after breach

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
2.6 acres	10S 0555107/ 4203095

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	60% * 3	1.8
High volume highway	40% * 1	0.4
	SLU Total	2.2

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover* (< 1 meter)	3	3
(1-3 meters)		[3]
(> 3 meters)		[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	2.2	3
<b>TOTAL FINAL SCORE</b>	<b>12.2</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see wildlife appendices.)  
 This site is located between two existing tidal marshes that are known to have black rails, CCRs, and SMHM all of which are sensitive species, so this site ranks fairly high. Vegetation on restoration site is well-developed, except for some of the transitional vegetation.

Song sparrows heard.

Invertebrates: mouse-eared marsh snail; scarlet spider mites; amphipods; small crane flies

Non-native rats are likely to prey on sensitive species and one dead rat was observed.

## 2. Wetland Dominant Vegetation

### Cover

This site has all the typical native tidal marsh expected in a healthy site. The surrounding transitional borders, however, have non-native grasses as well as broadleaved peppergrass and broom.

[No reported cases of non-native salt-water cord grass (*Spartina alterniflora*) reported here yet.]

## 3. Habitat Support/Buffer

This site ranks as a medium because it does have a buffer between 30 and 300 feet.

Excellent adjacent marsh and San Francisco Bay surround the site.

However, the landward edge is of limited value and is dominated by non-natives.

## 4. Hydrology

Tidal source is not likely to fail so this metric is scored high for this site.

## 5. Surrounding Land Use (SLU)

SLU consists of the Bay, adjacent tidal marshes, and a highway.

WEA FORM-- Completed by TEAM 2 = Lynn Suer)

Site #: 5

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB Ap #:
Richmond Parkway		

Assessment Date:	Evaluators:	Wetland Types(s):
5/11/03	Lynn Suer	Salt Marsh

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:

**Surrounding Land Use Category (SLU)**

Land Use Category	Score	x (% of area) =	Subtotals
salt marsh	* 20%	3*.2	0.6
moderate commerical	*20%	.5*.2	0.1
high volume highway	* 20%	1*.2	0.2
weedy fill	*40%	2*.4	0.8
		SLU Total	1.7

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover*	3	3
(< 1 meter)	[3]	[3]
(1-3 meters)	[3]	[3]
(> 3 meters)	[na]	[3]
3. Buffer/Upland	2.6	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	1.7	3
<b>TOTAL FINAL SCORE</b>	<b>12.3</b>	<b>15</b>

\*Add all 3 strata and divide by number of categories used for Dominant Vegetation Cover

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use

2. Wetland Dominant Vegetation  
Cover

3. Habitat Support/Buffer

4. Hydrology

5. Surrounding Land Use (SLU)

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 6

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Shell Marsh "Unit X"
2. **Project Location:** South of Waterfront Rd, northeast of Interstate 680, Martinez, CA. [Note: this should not be confused with the much larger Shell Marsh in Martinez, now known as McNabney Marsh. (?)]  
Lat/Long: 38°01'22"/ 122°06'33"  
Field GPS: 10S 0578442/ 4208552
3. **U.S. ACOE File Number:** 18254 E 10
4. **SFB RWQCB File No.:** WDID 2 0307060
5. **Wetland Type:** Freshwater/Brackish Marsh
6. **Project Size and Type:** Small, 0.7 acre freshwater/brackish perennial wetland
7. **Project Goals:** To provide one-for-one compensation in both area and habitat value, with a final habitat value higher than the impact site.
8. **Project Description:** Mitigation project was required as a corrective action for placement of fill in wetlands. This project is fed by a windmill which pumps water from Peyton Slough and has been functioning for over 10 years.
9. **Years of Required Monitoring:** 3 Years
10. **Years of Monitoring Completed:** 3 Years
11. **Project Permittee:** Shell Oil Company
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, and Pavlik
13. **Wetland Assessment Date:** March 20, 2003

## II. ECOLOGICAL WETLAND FUNCTION:

A botanical evaluation of this site which provides additional information on vegetation is provided below under #4.

### 1. Field Methods:

The entire perimeter of this small wetland was walked and one assessment was conducted. One transect was walked through a portion of the site (see # 4 below).

### 2. Site Evaluation Description:

Many of the target species planted in the early 1990s are still present, mainly species of sedge, and cattail. At the time of the assessment there was about 10% open water and vegetation was approximately: 35% *Scirpus*, 15% willow, 10% cattail, 10% pampas grass (on the edge), 10% coyote bush, 5% non-native grasses, 4% common reed (*Phragmites communis*), and less than 1% rush (*Juncus* sp.). No native sedges or grasses were observed.

The biggest threat is probably giant reed which is very close to the site followed by pampas grass which may fill in the wetland along the edges. The hydrologic source appears to be adequately maintaining the wetland which has dense but still viable vegetation.

### 3. WEA Scores:

Wildlife = 2

Vegetation = 2

- Herbaceous (< 1 Meter) [NA]
- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer = 1.5

Hydrology = 2

Surrounding Land Use = 1.2

**TOTAL: 8.7**

**4. Additional Botanical Evaluation of Shell Marsh Unit X provided by Bruce Pavlik, Ph.D., BMP Ecosciences<sup>1</sup>:**

C-S-R Rating: Palustrine Marsh = 2-2-2; Context = 1-1-1

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was across the southwest portion of the created marsh, with access afforded by the open ecotone with adjacent annual grassland. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by Tim, who was site manager/environmental compliance officer of Shell Oil, Martinez, CA.

**Project Description:** A 0.7 acre brackish to freshwater marsh creation performed in the summer and fall of 1991 by Shell Oil Company. The area is adjacent to Peyton Slough, a large, natural, brackish water marsh that provided the model (vegetation, hydrology) for the area to be converted from upland fill. During the 1920's the project site was probably a tidally influenced wetland (aerial photo taken 1921). Filling with manufacturing and construction debris completely obliterated the wetland by the 1960's. A new basin was excavated to a depth of 3', installed with a liner, backfilled, and supplied with a new source of freshwater. The water is being pumped from a well using a windmill and piped to the upslope end of the basin. The water flows slowly through the site, providing about 0.3 acres of open water surface, with depths up to 2'.

The source of plant materials for the new marsh vegetation is not known from the available records. Evidently, many native species were outplanted in the littoral zone of the pond (e.g., cattail, tule, nutsedge (*Cyperus* sp.) and in the surrounding grassland (e.g. purple needlegrass (*Nassella pulchra*), meadow barley (*Hordeum brachyantherum* ssp. *brachyantherum*). Monitoring began in 1992, and included species lists, visual cover estimates in three areas of the project, fauna, and hydrology. A species list for January 1994 contains 36 taxa, including some natives that are probably not native to the site (e.g., California button-willow (*Cephalanthus occidentalis*) and pickleweed).

During the 2003 evaluation, vegetation in the littoral zone had developed a very tall (>2 m), dense canopy that obscures the open water area. *Typha* sp. and *Scirpus* sp. provide an average of roughly 60% absolute cover, interrupted by thickets of pampas grass and willow. Adjacent upland areas were covered by weedy annual grasses and forbs (mostly non-native) and the nearby hillside supported plantings of ornamental trees and shrubs, as well as a few natives.

**Plant Species Observed in the Created Marsh:**

Giant reed – non-native grass, adjacent to the wetland in a few large patches - noxious weed that should be controlled

Hairy/smooth pampas grass– non-native grass, large individuals along the wetland margin -

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<sup>1</sup> References for Section 4 are:

Harding Lawson Associates (1989), Mitigation Plan Inactive Waste Unit X, Shell Martinez Manufacturing Complex, Martinez, CA.

Jones and Stokes Associates (1994). Results of the Third-Year Wetland Mitigation Monitoring, Shell Unit X Mitigation Project, Martinez, CA. Prepared for Pacific Environmental Group, San Jose, CA.

noxious weed that should be controlled  
Rush sp. – native graminoid, scattered along the wetland margin  
Common reed – native grass, uncommon along the wetland margin  
Shining willow (*Salix lasiandra*)– native shrub or small tree, a few large individuals  
California bulrush– native graminoid, dense, matted, monodominant in patches, creating dense thickets surrounding the wetland  
Common tule– native graminoid, dense in patches, creating thickets surrounding the wetland  
Broad-leaved cattail – native graminoid in dense patches surrounding the wetland

**Plant Species Observed in Adjacent Areas (incomplete):**

Acacia sp. – non-native shrub or tree on hillside  
Coyote bush – native shrub on adjacent grassland and hillside  
Ripgut grass (*Bromus diandrus*)– non-native annual grass on adjacent grassland  
Redstem filaree (*Erodium cicutarium*) – non-native annual forb  
Fennel – non-native invasive perennial herb – noxious weed that should be controlled  
Toyon – native shrub on hillside  
Barley (*Hordeum* sp.) – non-native annual grass on adjacent grassland  
Italian rye grass – non-native annual grass on adjacent grassland  
Redtop (*Phytolacca* sp.)– non-native shrub on hillside  
Pine (*Pinus* sp.) – non-native tree on hillside  
Black poplar (*Populus nigra* var. *italica*) – non-native tree on hillside  
Coast redwood (*Sequoia sempervirens*) – native tree, non-native to site, on hillside  
Vetch – non-native annual forb

**Vegetation Quality:** Low, perhaps moderate quality freshwater marsh was created in the project area that vaguely resembles similar kinds of vegetation in the general vicinity. Absolute cover by *Scirpus* sp. and cattails were moderate (50-75 % total), interrupted by tall, sometimes dense swards of non-native species. Adjacent areas were weedy and unmanaged and would act as sources of potentially invasive species if changes in marsh hydrology and sediment levels occurred.

**Recommendations:** Invasive non-native plants with potential to invade the marsh or its margins (giant reed, hairy pampas grass, fennel) should be eliminated as soon as possible. The same species in adjacent areas should be controlled, if not eliminated. Planting native species in the adjacent area and hillside (e.g., coast live oak (*Quercus agrifolia*) toyon, buckeye) could improve overall quality and extent of habitat.

**Overall Evaluation:** Project met permit conditions but produced low to moderate-quality wetland vegetation that barely enhances local biological resources. Existence of wetland conditions depends entirely on the operation of a mechanical pump. The surrounding landscape, which includes ornamental trees and shrubs, as well as intensive industrial development and a major highway, also undermine the ecological value of the project.

**III. PERMIT COMPLIANCE:**

Criteria:

1. Create 0.5 acres of wetland and 0.24 acres open water (pond)
2. 75% survival of plants
3. “Increase” habitat value
4. Hydrologic dynamics functioning.

Status:

The U.S. ACOE never signed off on this project but it appears to have met the performance criteria and remains a viable wetland since its creation in 1992.

#### **IV. WETLAND GAIN OR LOSS:**

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 0.7 and Restored Acres = 0.7**. Without knowing the quality of the impacted wetlands, this project is considered a simple trade-off for the lost wetlands. More recently, these kinds of projects are required to compensate for temporal losses in addition to spatial ones, by requiring higher than a 1:1 ratio of lost to gained wetlands. There is no net gain or loss for this project unless temporal losses are considered, in which case there may be a small loss.

#### **V. RECOMMENDATIONS:**

1. Plant natives in buffers – more coyote bush, oaks, *or* buckeyes.
2. Control non-natives especially giant reed, hairy pampas grass, and fennel.

WEA FORM  
Site #: 6

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
SHELL MARSH UNIT X	18254 E 10	2 0307060

Assessment Date:	Evaluators:	Wetland Type(s):
3/20/03	Breaux, Martindale, Evans, Cochrane, & Pavlik	Fresh/brackish Marsh

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
1 pm - 2 pm	Implemented in 1990

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
0.7 acres	10S 0578442/ 4208552

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Industrial	75% * 1	0.75
Low volume highway	25% * 2	0.5
	SLU Total	1.25

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover* (< 1 meter)	2	3
(1-3 meters)	[2]	[3]
(> 3 meters)	[na]	[3]
3. Buffer/Upland	1.5	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	1.25	3
<b>TOTAL FINAL SCORE</b>	<b>8.75</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use (For complete lists see wildlife appendices.)**

For such a small wetland in a heavily industrialized area, this wetland ranks medium for wildlife.

Some species at or very near the site included bushtit, redwinged blackbird, marsh wren, black phoebe, yellow-rumped warbler, western bluebird, and Anna's hummingbird.

Invertebrates included monarch butterflies, black grouse bugs

Reptiles: garter snake

Medium mammals: musk rat tracks

**2. Wetland Dominant Vegetation**

Cover

The site had a moderate amount of native wetland vegetation including sedge, rush, cattails.

There are a fair number of non-native invasive species that could adversely impact the site in future (giant reed, pampas grass).

**3. Habitat Support/Buffer**

The buffer for this site is rated low because even though it is greater than 30 ft which grades buffers as a "2", the vegetation in that buffer is invasive and likely to invade the wetland site if not controlled.

**4. Hydrology**

The hydrologic source for this wetland is likely to remain viable but the windmill could break and cutoff the water supply in the future. (Original cost of windmill in 1991 was \$15,000).

**5. Surrounding Land Use (SLU)**

The SLU is predominantly industrial and thus scores low.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 7

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Robert's Landing is the mitigation project for Heron Bay residential development
2. **Project Location:** Robert's Landing area along the eastern shoreline of the San Francisco Bay in the City of San Leandro, CA.  
Lat/Long: NA  
Field GPS: 10S 0573324/ 4170869
3. **U.S. ACOE File Number:** 19548 E 48
4. **SFB RWQCB File No.:** WDID 2 0301061
5. **Wetland Type:** Salt Marsh
6. **Project Size and Type:** 74 acres of enhanced salt marsh and 44 acres of restored salt marsh. Restored acres involve some removal of upland fill and channel excavation to restore tidal marsh.
7. **Project Goals:**
  - 1) Provide compensatory mitigation for the loss of wetland acreage and habitat value.
  - 2) Maximize and restore wetland values and functions through the following actions: restore muted tidal flows to 74 acres of diked salt marsh; restore tidal action on 17 acres of disturbed seasonal wetlands and on 10 acres of a former disposal site. Restore 17 acres of filled uplands to salt marsh. And finally, retain and enhance 18 acres of uplands for SMHM refugia, and enhance habitat values for existing populations of the endangered SMHM. (There is some discrepancy in reports between "enhanced" and "restored" which should be clarified and adjusted in Table 2 of this report, if necessary. See section IV "Wetland Gain or Loss" below for further explanation.)
  - 3) Clean-up of localized sites of chemical contamination of existing wetlands and restoration of these sites to provide valuable wetland habitat.
  - 4) Provide long-term protection of salt marsh and associated upland habitats and correction of current and ongoing problems (primarily subsidence) that threaten to reduce long-term habitat quality.
8. **Project Description:** This mitigation project was designed to compensate for impacts to 13 acres of seasonal wetlands resulting from the construction of a 79 acre residential development. The mitigation site contributes to a total tidal marsh area of about 132 acres which was restored through sediment removal, channel excavation, completing a tide gate and bridge structure, and disking compacted soils.
9. **Years of Required Monitoring:** 10 Years (first 5 years intensive; last 5 years less intensive)
10. **Years of Monitoring Completed:** 5 Years
11. **Project Permittee:** Citation Homes Central
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Pavlik & Smith. Also Ned Lyke, invertebrate specialist from Cal State Hayward and Steve Foreman, LSA consultant for the project.
13. **Wetland Assessment Date:** March 27, 2003 (9 am – 12 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

A botanical evaluation of this site which provides additional information on vegetation is provided below under #4.

### 1. Field Methods:

About half of the perimeter of this site was driven by car with occasional stops to assess vegetation. One assessment was conducted by the WEA Team where approximately

90% of the entire 134-acre site could be seen. However, the vegetation and invertebrate transects that were walked by the WEA Team covered only about 2 of those 134 acres and those 2 assessed acres were from an area restored by removing fill down to bay muds. (See #4 below for a detailed vegetation assessment of this transect as well as another transect conducted in the “Trojan Marsh” segment of the Robert’s Landing/Citation Homes project).

## 2. Site Evaluation Description:

The WEA Team described 90% of the site that was visible from the assessment point as having the following rough approximations on the day of the assessment: 15% open water (tidal channel and 2 tidal ponds); 15% upland and grassland; and 70% tidal marsh vegetation. The tidal marsh vegetation broke down into 55% pickleweed, 5% cord grass *sp.*, 3% gumplant, 3% alkali heath, and less than 1% each of saltbush (*Atriplex* *sp.*), brassbuttons (*Cotula coronopifolia*), and sea-lavendar (*Limonium californicum*). Overall, the enhanced and restored areas looked very similar to each other.

## 3. WEA Scores:

Wildlife = 2

Vegetation = 2.2

- Herbaceous (< 1 Meter) [2.2]
- Shrub (1-3 Meters) [na]
- Trees (> 3 Meters) [na]

Buffer = 2

Hydrology = 2.5

Surrounding Land Use = 2.2

**TOTAL: 10.9**

## 4. Additional Botanical Evaluation of Robert’s Landing provided by Bruce Pavlik, Ph.D., BMP Ecosciences: Note: this project also listed under the project name of Citation Triangle Marsh”.<sup>2</sup>

C-S-R Rating: Tidal salt marsh = 2-3-3; Context = 1-1-2

**4 (a) Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was perpendicular to the remnant berm road, extending into the main part of the marsh. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by Dr. Steve Forman of LSA (Richmond, CA), consultants to Citation Homes Central (Santa Clara, CA).

**Project Description:** This was part of a 74 acre tidal marsh enhancement (that included Trojan Marsh) performed in 1995 by LSA. The area is adjacent to a large complex of natural, enhanced, and created saltmarshes that provide the local model (vegetation, hydrology). Some of those marsh areas have subsided, requiring gated regulation of tidal flood levels to prevent detrimental inundation of pickleweed. A large central dike, the base for a proposed paved road, was removed by excavating 40-50 K cubic yards of material down to a natural surface of bay mud. The fill was either used for adjacent development, or formed into a low ridge that separates the Citation Triangle Marsh from the Bluebird Marsh (a excavation/tidal marsh creation project covering 17 acres, not evaluated here). Enlarged channels (some dendritic, others straight) and regulated tidal action appear to be sufficient to bring water to the most

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Sources used for both botanical evaluations of Robert’s Landing include:

<sup>2</sup> RMI, Inc. (1995). Final Roberts Landing Mitigation and Monitoring Plan. Prepared for Citation Homes Central, Santa Clara, CA.

LSA Associates, Inc. (2000). Roberts Landing Mitigation and Monitoring Plan, Year One and Two Monitoring Report. Prepared for Citation Homes Central, Santa Clara, CA.

interior edges of the marsh. Approximately 15% of the total area is now open water.

Propagules for marsh vegetation came into the area on their own, either from restored tidal influx or from the existing degraded populations. Annual monitoring of vegetation, fauna, soil and hydrology were used to determine if a lengthy and sophisticated list of performance criteria were being met. Replicated 100 m long permanent transects were installed in four habitat types (transitional grassland, restored marsh, excavated tidal channels, and retained uplands). At least 10 1 m<sup>2</sup> plots were randomly located along each transect in every monitoring year (5 years total) and used to estimate absolute cover for each species (by cover class value), beginning in 1996.

Within the enhanced triangle marsh, pickleweed and other native salt marsh species immediately began to develop a nearly uniform, extensive cover. Absolute cover by salt marsh species almost tripled within the first two years (from 19% to 53%), accompanied by a halving of annual grass cover. During the 2003 evaluation, the saltmarsh vegetation of the enhanced marsh was almost indistinguishable from that of the adjacent, natural marshes. It had a lighter color and was not quite as dense, but for all intents and purposes it had natural patterning (i.e. species distributions, patchiness) and was dominated by native species. Adjacent upland areas were covered by weedy annual grasses and forbs (mostly non-native).

**Plant Species Observed in the Enhanced Marsh (incomplete):**

Brassbuttons – non-native forb

Saltmarsh dodder (*Cuscuta salina*) – uncommon on native shrubs

Salt grass – sparse, uncommon or rare

Alkali-heath – dense, in small patches along channels or slight rises

Gumplant sp. – in small patches in open clay along levees, channels, marsh-upland ecotone

Sea-lavender – sparse, in transitional areas

Fleshy jaumea – sparse, uncommon or rare

Pickleweed – dense, matted, monodominant in patches, across most of the created site

Salt-water cord grass – sparse or in small patches, along lowest elevations in channels and in patches near the natural marsh

**Plant Species Observed in Adjacent Areas (incomplete):**

Australian saltbush (*Atriplex semibaccata*) - non-native shrub on upland berms

Wild oats – non-native annual grass on upland berm

Coyote bush – native shrub on upland berm

Black mustard (*Brassica nigra*) – non-native annual forb on adjacent grassland

Ripgut grass – non-native annual grass on adjacent grassland

Soft cheat grass (*Bromus hordeaceus*) – non-native annual grass on adjacent grassland

Redstem filaree – non-native annual forb on adjacent grassland

Mediterranean barley?(\**subspecies not cited*) (*Hordeum marinum* – non-native annual grass on adjacent grassland

Meadow barley (*Hordeum brachyantherum*) [\**subspecies not cited* ]– native perennial grass on adjacent grassland

Rush sp. – native graminoid in seasonal wetland, sparse

Italian rye grass – non-native annual grass on adjacent grassland and seasonal wetland

Bristly ox-tongue – non-native annual forb on adjacent grassland

Curly dock – non-native forb on adjacent grassland

**Vegetation Quality:** Medium to high quality, immature tidal marsh was enhanced in the project area that resembled the adjacent natural marsh. Absolute cover by pickleweed was moderate (40-70 %), interrupted by patches of alkali-heath, gumplant, and salt-water cord grass. Saltgrass and fleshy jaumea were surprisingly rare, if not absent, from most of the created marsh. Adjacent uplands were a mix of seeded natives (e.g. *Hordeum brachyantherum*) and weeds.

**Recommendations:** Invasive, non-native plants in adjacent areas should be controlled, if not

eliminated, to improve habitat quality at the edge of the marsh. Planting with coyote bush could provide more native cover.

**Overall Evaluation:** Project met permit conditions and produced valuable vegetation that enhances local biological resources. Long-term value will depend on tidal gate operation and impacts from adjacent development.

\*\*\*\*\*

**Second botanical evaluation of Robert's Landing, also known as "Citation Trojan" site.**  
C-S-R Rating: Tidal saltmarsh = 2-3-3; Context = 1-1-2

**4. (b) Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was perpendicular to the paved road on the south side of the marsh, extending north into the main part of the marsh where an explosives shed once stood. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by Dr. Steve Forman, who was involved with the project at LSA of Richmond, CA), consultants to Citation Homes Central (Santa Clara, CA).

**Project Description:** This was part of a 74 acre tidal marsh enhancement (that included Citation Triangle Marsh) performed in 1995 by LSA (consultants to the city of San Leandro and Citation Homes). The area is adjacent to a large complex of natural, enhanced, and created saltmarshes that provide the local model (vegetation, hydrology). Some of those marsh areas have subsided, requiring gated regulation of tidal flood levels to prevent detrimental inundation of pickleweed. Other areas, such as Trojan Marsh (named for the explosives company that once occupied the site), had been isolated from tidal waters and San Leandro Creek by dikes and roads. To enhance the hydrology of Trojan Marsh, a straight, 3' deep, 3' wide artificial channel was cut from west to east to supply tidal waters to the most inland extent of the marsh. Natural, minor channels had since formed in the marsh, connecting to the artificial channel. Approximately 5% of the total area is now channel or open water.

Trojan marsh was already vegetated with pickleweed and its common associates before the channel was dug. The vegetation had been degraded, however, by invasion of upland, grassland species. Propagules for marsh vegetation came into the area on their own, either from restored tidal influx or from the existing degraded populations. Annual monitoring of vegetation, fauna, soil and hydrology were used to determine if a lengthy and sophisticated list of performance criteria were being met. Replicated 100 m long permanent transects were installed in four habitat types (transitional grassland, restored marsh, excavated tidal channels, and retained uplands). At least 10 1 m<sup>2</sup> plots were randomly located along each transect in every monitoring year (5 years total) and used to estimate absolute cover for each species (by cover class value), beginning in 1996.

During the 2003 evaluation, the saltmarsh vegetation of the enhanced marsh was almost indistinguishable from that of the adjacent, natural marsh to the west. It had natural patterning (i.e. species distributions, patchiness) and was dominated by native species with little or no non-natives except around its elevated margins. Adjacent upland areas were covered by weedy annual grasses and forbs (mostly non-native), as well as native and non-native species that had been planted to enhance the suburban edge.

**Plant Species Observed in the Enhanced Marsh (incomplete):**

Salt grass – sparse, uncommon or rare  
Alkali-heath – dense, in small patches along channels or slight rises  
Gumplant– in small patches in open clay along levees, channels, marsh-upland ecotone  
Pickleweed – dense, matted, monodominant in patches, across most of the created site

**Plant Species Observed in Adjacent Areas (incomplete):**

Australian saltbush (*Atriplex lentiformis*) - native shrub planted on upland berms  
Coyote bush – native shrub on upland berm  
Black mustard– non-native annual forb on adjacent grassland  
Ripgut grass– non-native annual grass on adjacent grassland  
Soft cheat grass – non-native annual grass on adjacent grassland  
Redstem filaree – non-native annual forb on adjacent grassland  
Barley (*Hordeum*) sp. – non-native annual grass on adjacent grassland  
Meadow barley – native perennial grass on adjacent grassland  
Medick sp. (*Medicago* sp.) - non-native annual forb on adjacent grassland  
Wild radish - non-native annual forb on adjacent grassland  
Curly dock – non-native forb on adjacent grassland  
Milk thistle- non-native biennial forb on adjacent grassland

**Vegetation Quality:** Medium quality, mature tidal marsh was enhanced in the project area that closely resembled the adjacent natural marsh. Absolute cover by pickleweed was moderate (40-60 %), interrupted by large patches of alkali heath (30-40%) and salt grass (5-15%). fleshy jaumea and cord grass were essentially absent. Adjacent uplands were a mix of seeded natives (especially meadow barley that had been brought from off-site) and weeds.

**Recommendations:** Invasive, non-native plants in adjacent areas should be controlled, if not eliminated, to improve habitat quality at the edge of the marsh. Planting with coyote bush could provide more native cover along roads, berms and the suburban interface.

**Overall Evaluation:** Project met permit conditions and significantly enhanced existing vegetation. Consequently, more contiguous tidal marsh habitat is available for local biological resources. Long-term value will depend on tidal gate operation, channel integrity, and impacts from adjacent development.

### III. PERMIT COMPLIANCE:

There are approximately 15 detailed performance criteria for this project including ones for tidal elevations, SMHM presence, and native and non-native species for the enhanced, restored, and upland areas of the project site. These can be found in the *Robert's Landing Mitigation and Monitoring Plan Year Four and Five Monitoring Report* (LSA, draft 2003). According to this report, the only performance criteria that is not being met at Year 5 of the 10 Year monitoring program is the one that requires that relative cover be within 70% of reference sites with at least 80% of the species native to San Francisco Bay tidal marshes. The wetland species in the restored marsh are well over the first part of the performance criteria with 97% of reference area values. However only 50% of those species are native. If non-native salt-water cord grass can be controlled, and as the tidal marsh vegetation expands in the enhancement area, the numbers of natives is likely to increase. If not, the practicality of 80% native vegetation should be investigated. (Note that a similar high requirement of natives at Green Valley Creek project was determined by the WEA team to be impractical for the grasslands of that site.) This project is in compliance at Year 5 and is likely to remain so through the end of the Year 10 monitoring period.

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted arces = 13 acres and Restored = 44 acres; Enhanced = 74 acres; Upland Refuge = 18 acres.** This project appears to be contributing substantially to a large tidal marsh wetland ecosystem by restoring and enhancing tidal marsh habitat. The status of native tidal marsh vegetation and the presence of salt marsh harvest mice in the restored area will continue to be assessed as part of the monitoring program.

There seems to be some confusion about the terms “enhancement” and “restoration” which are used interchangeably in documents relating to the project. These terms are important in terms of meeting the wetland no net policy because “enhancement” does not increase the quantity of wetlands but “restoration” does. Most of this project appears to have restored former tidal marsh or substantially enhanced or improved existing tidal channels and tidal marsh vegetation to the area. At the end of the 10 Year monitoring period the final wetland acreage can be compared to what existed before the mitigation project and both increased quantity and quality can be

assessed. Even if the site is entirely enhanced (as opposed to restored) and results in no gain in acreage but a substantial improvement in native tidal marsh vegetation with healthy SMHM populations in a large contiguous and protected tract, then the site may be deemed an excellent and worthwhile project that contributes to the goal of improving tidal marsh quantity and quality in the San Francisco Bay. The overall estimate of gain for this project is presently estimated at a gain of 31 acres restored and 74 enhanced which excludes the important upland refugial habitat because it is not technically wetland acreage.

**V. RECOMMENDATIONS:**

1. Plant more coyote bush in the area surrounding the tidal marsh site and control invasives there.
2. Determine the feasibility of controlling non-native salt-water cord grass (*Spartina alterniflora*).
3. Keep tide gates free of debris including excessive barnacles.
4. Keep cats, dogs, foxes and other predators out of the area.

WEA FORM  
Site #: 7

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project XX	Existing Condition XX	Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
Robert's Landing	19548 E 48	2 0301061

Assessment Date:	Evaluators:	Wetland Type(s):
3/27/03	Breaux, Cochrane, Evans, Martindale, Pavlik & Smith	Tidal Marsh

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
9am to 12 am	Levee breach in 12/97, so site just over 5 years old

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
33 acres restoration 74 acres enhancement	10S 0573324/ 4170869

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	50% * 3	1.5
Single family residential	30% * 1.5	0.4
Recreational (heavily used trail)	20% * 1.5	0.3
	SLU Total	2.2

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover*	2.2	3
(< 1 meter)	[2.2]	[3]
(1-3 meters)	[na]	[3]
(> 3 meters)	[na]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	2.5	3
5. Surrounding Land Use	2.2	3
<b>TOTAL FINAL SCORE</b>	<b>10.9</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see wildlife appendices.)  
Enhanced area known to harbor SMHM (noted in monitoring reports)  
so this site scores at least a "2" for harboring a special status species.  
Other wildlife observed includes:  
Birds: song sparrow, mourning dove, red-winged blackbird, cliff & barn swallows, savannah sparrow; mallard, widgeon, cinnamon teal, green-winged teal; willet, great egret, marbled godwit, greater yellow legs, long billed curlew, western & least sandpipers  
Invertebrates: baltic clam, isopod, mudcrab, amphipod, pygmy blue butterfly, brine fly, ground spider, lady bug larvae.  
Mammals: jack rabbit, ground squirrel

2. Wetland Dominant Vegetation Cover  
Tidal marsh vegetation is dominant and has begun to replace non-native grasses that reportedly dominated the site. Annual grasses still present, and invasive salt-water cord grass reported on site.

3. Habitat Support/Buffer  
Buffer between 30 to 300 feet so medium score. About 100 foot buffer from the development, but the public uses edge of marsh a lot.

4. Hydrology  
High hydrology score because marsh adequately inundated and hydrologic source likely to remain adequate in the future.  
One main tide gate for site (?).

5. Surrounding Land Use (SLU)  
SLU is mostly natural area and single-family housing.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 8

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Triangle Schnitzer Marsh
2. **Project Location:** West end of Winton Ave., on the north & west sides of a closed landfill known as “Mt. Trashmore”, Hayward, CA.  
Lat/Long: 37°27’30”/ 122°58’48”  
GPS: S10 0574518/ 4166770
3. **U.S. ACOE File Number:** 16681E35
4. **SFB RWQCB File No.:** WDID 2 0301067
5. **Wetland Type:** Muted tidal marsh
6. **Project Size and Type:** 7 acres of enhancement (more likely restoration – see Section IV below) for impacts to 1.3 acres at Oakland Harbor.
7. **Project Goals:**
  - 1) Improve conditions for pickleweed in the marsh, in order to improve habitat for the SMHM;
  - 2) Improve water circulation throughout the marsh in order to control mosquito reproduction;
  - 3) Improve habitat for invertebrates, fish and birds in a stagnant pond (the “buffer pond” by creating a new tidal connection;
  - 4) Provide a refuge for fish in the upper marsh during low tide

Species to consider: shorebirds, herons, egrets and waterfowl. Endangered and rare species to consider include the SMHM, saltmarsh song sparrow, CCR, and black rail.
8. **Project Description:**

Marsh was modified in July and August 1990, modification included:

  - a) Installation of two 3-foot diameter culverts with slide/flap gates, connecting to the Bay
  - b) Installation of new interior culverts at three locations
  - c) Enlargement of existing channels and excavation of new ditches to improve circulation
  - d) Creation of a small pond at the end of the “pan handle” to provide a refuge for small fish at low tide
9. **Years of Required Monitoring:** 5 Years
10. **Years of Monitoring Completed:** Just 2 Years (?) (The first monitoring report covers from spring 91- spring 92)
11. **Project Permittee:** Schnitzer Steel Products Co.
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Pavlik, and Smith. Lynn Suer participated as an outside evaluator. Mark Taylor, East Bay Regional Park District, met us at the site. EBRPD handles the property.
13. **Wetland Assessment Date:** March 27, 2003 (1:30-3:00 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

This site has an additional WEA score provided by Dr. Lynn Suer to test the repeatability of the assessment method which she conducted without knowledge of the assessment team’s scoring or discussion. The WEA Team’s scores are under 3 (a) and the outside assessor’s scores are under 3 (b). In addition, a botanical evaluation of this site providing additional information on vegetation is provided below under #4.

### 1. Field Methods:

The length along the bay of this relatively small site was walked by the team members (= segment 1), with an additional walk along the perimeter of a protruding section of the site (=

segment 2). Two locations were assessed, the first from a bridge where about 65% of the entire site could be seen, and the second from the second segment which covered a smaller area.

## 2. Site Evaluation Description:

From the first location the primary elements of the site included approximately: 20% open water (tidal pond and channel); 75% pickleweed, 4% alkali-heath, and 1% gumplant. The upland area had non-natives (e.g., mustard [*Brassica* sp.] and hairy pampas grass) mixed with a predominance of coyote bush. The second location was similar with 20% open water; 60% pickleweed, 5% coyote bush, 2% gumplant, 3% ruderal vegetation, and 10% covered by a road.

### 3(a). WEA Scores:

Wildlife = 2

Vegetation = 2.4

- Herbaceous (< 1 Meter) [2.4]
- Shrub (1-3 Meters) [2.5]
- Trees (> 3 Meters) [na]

Buffer = 2

Hydrology = 2

Surrounding Land Use = 2.5

**TOTAL: 10.9**

### 3(b). Outside Evaluator's Scores:

Wildlife = 2

Vegetation = 2.4

- Herbaceous (< 1 Meter) [2.8]
- Shrub (1-3 Meters) [2]
- Trees (> 3 Meters) [na]

Buffer = 1 [Represents disagreement with WEA Team about whether a small road should count as buffer.]

Hydrology = 2.5

Surrounding Land Use = 1.8 [WEA Team gave much less space to the landfill and more to the surrounding tidal marsh and San Francisco Bay.]

**TOTAL: 9.7**

## 4. Additional Botanical Evaluation of Triangle Schnitzer Marsh provided by Bruce Pavlik, Ph.D., BMP Ecosciences<sup>3</sup>:

C-S-R Raating: Tidal Marsh = 2-2-3; Context = 1-1-1

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was parallel to the dike road on the west side, extending south from the tidal gate and around the southern end of the project area, doubling back into the main part of the marsh. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by Mark Taylor of the East Bay Regional Park District (EBRPD).

**Project Description:** A 7 acre tidal marsh enhancement (with deepwater pool, not evaluated

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References for Triangle Schnitzer:

<sup>3</sup> Philip Williams & Associates (1992). Triangle Marsh Monitoring Report No. 1.

Philip Williams & Associates (1993). Triangle Marsh Monitoring Report No 2

here) was designed by Philip Williams and Associates (consultants to the Hayward Area Recreation and Park District, later part of the EBRPD). The area is at the western edge of a closed landfill, but isolated from the bay by a dike road. Prior to 1991, poor drainage and subsidence was keeping this marsh inundated for long periods of time. Pickleweed had died back to less than 50% absolute cover and algal mats became prominent. In order to dampen the tidal regime, new control gates and flood channels were constructed in 1990. One gate has been kept partially open, the other closed, since that time (no seasonal or yearly adjustments have been made) and inundation time has been effectively reduced. The constructed channels are straight and deep (along the north and western edges), and there are few natural channels that permeate the project area.

Monitoring began in 1992 and included vegetation, fauna, hydrology and sedimentation. Vegetation monitoring was only with photo plots permanently established at nine stations. Consequently, no quantitative measures of vegetation attributes are presented in the monitoring reports.

Propagules for marsh vegetation came into the area on their own, with pickleweed developing a nearly uniform, extensive cover within only two years as judging from photographic comparisons. During the 2003 evaluation, the saltmarsh vegetation of the enhanced marsh was almost indistinguishable from that of other natural marshes in the general vicinity. The pickleweed canopy (>90% absolute cover) was occasionally interrupted by alkali-heath (<15% absolute cover), but jaumea and saltgrass were essentially absent. There were no non-native plants in the saltmarsh vegetation. Non-native salt-water cord grass had been effectively removed by EBRPD staff. However, adjacent upland areas were covered by weedy annual grasses and forbs (mostly non-native), including some species considered as aggressive, potential invaders.

#### **Plant Species Observed in the Enhanced Marsh:**

Brassbuttons – uncommon non-native forb  
Saltmarsh dodder – uncommon on native shrubs  
Alkali-heath – dense, in small patches along channels or slight rises  
Gumplant – in small patches in open clay along levees, channels, marsh-upland ecotone  
Pickleweed – dense, matted, monodominant in patches, across most of the created site

#### **Plant Species Observed in Adjacent Areas (incomplete):**

Spearscale (*Atriplex triangularis*) - native annual on upland berms  
Wild oats – non-native annual grass on upland berm  
Coyote bush – native shrub on upland berm  
Field mustard (*Brassica rapa*) - non-native annual forb on adjacent grassland  
Black mustard – non-native annual forb on adjacent grassland  
Ripgut grass – non-native annual grass on adjacent grassland  
Soft cheat grass – non-native annual grass on adjacent grassland  
Foxtail chess (*Bromus madritensis ssp. rubens*) – non-native annual grass on adjacent grassland  
Hairy/smooth pampas grass – large individuals along the marsh margin and on the adjacent grasslands - noxious weed that should be controlled  
Redstem filaree – non-native annual forb on adjacent grassland  
Fennel – non-native invasive perennial herb – noxious weed that should be controlled  
Barley sp. – non-native annual grass on adjacent grassland  
Italian rye grass – non-native annual grass on adjacent grassland and seasonal wetland  
Tree-tobacco (*Nicotiana glauca*) - non-native shrub on adjacent grassland  
Bermuda buttercup (*Oxalis pes-caprae*) - non-native perennial forb on adjacent grassland  
Bristly ox-tongue – non-native annual forb on adjacent grassland  
Wild radish - non-native annual forb on adjacent grassland  
Curly dock – non-native forb on adjacent grassland

**Vegetation Quality:** Medium to high quality, mature tidal marsh was enhanced in the project area by reducing inundation of pickleweed (absolute cover now exceeded 90%). Patches of alkali-heath and gumplant (no more than 15% absolute cover) were infrequent and with the absence of native California cord grass, saltgrass, and fleshy jaumea the vegetation was rather homogeneous. The monotonous character also results from the lack of internal, sinuous channels that could provide more habitat edge for plants and animals. Adjacent uplands support poor quality annual grassland, with few natives and many potentially invasive weeds.

**Recommendations:** Homogeneity of vegetation indicates hydrological and topographic homogeneity. The project would have benefited from installation of sinuous internal channels and perhaps more variation in the operation of the floodgates. Invasive, non-native plants in adjacent areas should be controlled, if not eliminated, to improve vegetation quality at the edge of the marsh. Planting with coyote bush could provide more native cover.

**Overall Evaluation:** Project met permit conditions and produced valuable vegetation that enhances local biological resources. Long-term value will depend on tidal gate operation, channel maintenance and control of invasive plants along the edges.

### III. PERMIT COMPLIANCE:

Criteria:

No quantitative performance criteria were identified and there is no record of more than 2 monitoring reports, though 5 were required. Overall stated goals are to improve pickleweed growth, water circulation, and habitat for SMHM, fish, birds, and invertebrates

The project does seem to have improved tidal marsh vegetation cover, if the baseline was 50% (see Section II (4) above).

**Status:**

U.S. ACOE signed off on this project??

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 1.3 and Restored Acres = 7 Acres**. This site was labeled "enhancement" but has been changed to "restoration" here due to the expected degree of positive habitat change brought on by the hydrologic changes. The site scored relatively high for ecological performance acreage and it probably represents a net gain in wetland quality and quantity. Successful efforts have been made to exclude invasive non-native salt-water cord grass from the site which is a benefit to the project.

### V. RECOMMENDATIONS:

1. Allow EBRPD to continue managing the site for removal of invasive salt-water cord grass and as habitat for the black rail.
2. Remove pampas grass from upland/transitional border and other non-native invasive species.

WEA FORM  
 Site #: 8

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Triangle Schnitzer Marsh	16681 E 35	2 0301067

Assessment Date:	Evaluators:	Wetland Type(s):
3/27/03	Breaux, Martindale, Evans, Cochrane, Pavlik, Smith	Tidal salt marsh enhancement

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
1:30–3:00 pm	1990 (=13 years)

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
7 acres	10S 0574518/ 4166770

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	50% * 3	1.5
Low volume highway	25% * 2	0.5
Landfill	25% * 2	0.5
	SLU Total	2.5

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover* (< 1 meter)	2.4	3
(1-3 meters)	[2.4]	[3]
(> 3 meters)	[2.5]	[3]
3. Buffer/Upland	[na]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	2.5	3
<b>TOTAL FINAL SCORE</b>	<b>10.9</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant

## Vegetation Cover.

### FIELD & FOLLOW UP NOTES:

#### 1. Wildlife Use (For complete lists see wildlife appendices.)

Wildlife observed included:

Birds: song sparrow, red-winged black bird, mallard, killdeer, snowy egret, northern harrier, common raven, barn swallow.

Invertebrates included crab, clam, mussel, mud snail, amphipod.

Mammals: jack rabbit, ground squirrels

Special status species: this site is known to have black rails (pers. comm., Mark Taylor, East Bay Parks District); also good habitat & area for SMHM and the Alameda Song Sparrow

#### 2. Wetland Dominant Vegetation Cover

Healthy tidal marsh with low amount of aggressive non-natives, and good regeneration and structural diversity of native vegetation. There are some non-natives around the border that could pose a future problem, namely mustard, fennel, and pampas grass

Shrub layer is mostly coyote bush.

#### 3. Habitat Support/Buffer

Buffer is between 30 and 300 feet and consists mostly of a landfill (about 50%), San Francisco Bay (about 50%), and a small road between the assessment site and the Bay.

#### 4. Hydrology

Hydrologic regime is adequate to maintain a viable wetland system but tidal gate could break again as it has in the past.

#### 5. Surrounding Land Use (SLU)

The SF Bay is considered natural (=3), the small road or low volume highway considered medium impact (=2) and the landfill considered medium impact.

WEA FORM  
Site #: 8

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	Existing Condition	Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
Triangle Schnitzer	16681 E 35	2 0301067

Assessment Date:	Evaluators:	Wetland Type(s):
3/27/03	Lynn Suer	Tidal Marsh

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
1:30-3:00 pm	1991

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
7	

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	25% * 3	0.75
Landfill	75% * 1.5	1.1
	SLU Total	1.8

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover* (< 1 meter)	2.4	3
(1-3 meters)	[2.8]	[3]
(> 3 meters)	[2]	[3]
3. Buffer/Upland	[na]	[3]
3. Buffer/Upland	1	3
4. Wetland Hydrology	2.5	3
5. Surrounding Land Use	1.8	3
<b>TOTAL FINAL SCORE</b>	<b>9.7</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use**

Luxuriant pickleweed/alkali-heath with coyote bush buffer at transition to landfill. Mudsnaills, clams, mussels, amphipods, egrets, sparrows, "mouse habitat"

**2. Wetland Dominant Vegetation Cover**

Dense pickleweed; non-natives at transition to landfill and along dike and road.  
Non-native invasive salt-water cord grass under control.  
Shrubs = coyote bush.

**3. Habitat Support/Buffer**

Adjacent buffer averages less than 30 feet and is not connected or is poorly connected to wildlife corridors. A road/dike separates site from adjoining marsh.

[NOTE: OTHER ASSESSMENT TEAM CONSIDERED THIS A VERY SMALL ROAD THAT COULD EASILY BE CROSSED BY MAMMALS, HERPS, OR BIRDS, SO IT WAS SCORED A 2 BY OTHER TEAM]

**4. Hydrology**

Gave a 2.5 for dependable hydrology because tide gate adjustment needed only during the highest flood tides.

**5. Surrounding Land Use (SLU)**

Considered most of site surrounded by land fill (75%) and only 25% surrounded by San Francisco Bay. [OTHER TEAM GAVE 50% TO SF BAY , 25% TO SMALL ROAD AND 25% TO LANDFILL.]

## Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 9: Note: this site was not assessed because it appears to have never happened. Paperwork at the U.S. ACOE shows that the State Water Resources Control Board denied the project. The current wetland site visited by the WEA Team appears to have been avoided and the large (5+ acres of proposed impacts to the site) development project that would have filled wetlands appears to have not taken place. Consequently there was no need for mitigation of wetlands and this project will be removed from the database.

### I GENERAL PROJECT INFORMATION

1. **Project Name:** Mayhews Landing
2. **Project Location:** Off old Jarvis Rd., Newark  
Lat/Long: 37° 31' 41" / 122° 03' 42"  
Field GPS: 10S 0582856 / 4154262
3. **U.S. ACOE File Number:** 13199 E 75/19783 E 75
4. **SFB RWQCB File No.:** WDID 2 0301064
5. **Wetland Type:** [Intended to be a tidal wetland]
6. **Project Size and Type:** [Intended to restore 5 acres]
7. **Project Goals:** N.A.
8. **Project Description:** [This mitigation project never happened because the impacts for which the project was to compensate for were avoided.]
9. **Years of Required Monitoring:** N.A.
10. **Years of Monitoring Completed:** N.A.
11. **Project Permittee:** DeSilva Group
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Pavlik
13. **Wetland Assessment Date:** Site was visited but not assessed on March 27, 2003

### II. ECOLOGICAL WETLAND FUNCTION: N.A.

1. **Field Methods:**
2. **WEA Scores:**
  - Wildlife =
  - Vegetation =
    - Herbaceous (< 1 Meter) [NA]
    - Shrub (1-3 Meters) [NA]
    - Trees (> 3 Meters) [NA]
  - Buffer =
  - Hydrology =
  - Surrounding Land Use =

**TOTAL:**

### III. PERMIT COMPLIANCE:

N.A: Mitigation project was avoided.

### IV. WETLAND GAIN OR LOSS:

N.A.

### V. RECOMMENDATIONS:

None.

WEA FORM

Site #: 9. Note: no assessment took place because impacts to site were apparently avoided.

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	Existing Condition	Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
Mayhews Landing	13199 E 75/ 19783 E 75	2 0301064

Assessment Date:	Evaluators:	Wetland Type(s):
Visited but not assessed on 3/27/03	Breaux, Martindale, Evans, Cochrane, Pavlik	Seasonal/ tidal

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area		
Unimproved pasture/rangeland		
Low intensity commercial (marina)		
Improved pasture		
	SLU Total	

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization [WU]		3
2. Dominant Vegetation Cover* (< 1 meter)		3
(1-3 meters)		[3]
(> 3 meters)		[3]
3. Buffer/Upland		3
4. Wetland Hydrology [Hyd]		3
5. Surrounding Land Use		3
<b>TOTAL FINAL SCORE</b>	<b>0</b>	<b>15</b>

**\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.**

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see Appendix X)

2. Wetland Dominant Vegetation Cover

3. Habitat Support/Buffer

4. Hydrology

5. Surrounding Land Use (SLU)

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 10

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Dublin Meadows, Alamo Creek
2. **Project Location:** South of Amador Valley Blvd., south and east of Stagecoach Dr., Dublin, CA.  
Lat/Long:  
Field GPS: 10S 0595779/ 4175057
3. **U.S. ACOE File Number:** 17167 E 75A
4. **SFB RWQCB File No.:** WDID 2 0301049
5. **Wetland Type:** Riparian
6. **Project Size and Type:** 3.8 acres of enhanced riparian corridor
7. **Project Goals:** Approximately 3.8 acres of riparian woodland habitat will be re-established within the project site. The completed revegetation treatment will re-establish the riparian woodland habitat and provide effective canopy cover for wildlife. The number of native trees will be greater than now existing, and the native shrubs to be added should further enhance the wildlife habitat.
8. **Project Description:** This site is to be replanted with trees, shrubs, and groundcover (?) to compensate for impacts to 0.12 acres of wetlands/U.S. waters from a stream bank stabilization project related to a housing development with 206 multiple family residential units. Planted 245 trees with an expected survival of 184. No planting plan is available with the locations of these planted trees and no list of what kinds of shrubs and groundcovers were planted or where they were planted. (U.S. ACOE staff will check office files once more to verify this.)
9. **Years of Required Monitoring:** 10 Years (Years 1, 2, 3, 5, 7, and 10).
10. **Years of Monitoring Completed:** 0 ?? [no monitoring reports found at U.S. ACOE office in San Francisco, CA]
11. **Project Permittee:** Golden Eagle Insurance Co & the City of Dublin Public Works Dept.
12. **Wetland Assessors:** Benner, Breaux, Cochrane, Evans, Martindale
13. **Wetland Assessment Date:** March 28, 2003 (9:30 am to 12 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

No site map was available for this site with the exact project boundaries so the WEA team walked what was thought to be the perimeter of the re-planted area. The assessment was conducted from a point from which about 30% of the approximately 3 acre site could be seen, and one 13 meter transect was run through the planted area.

### 2. Site Evaluation Description:

From the assessment point the following rough approximation was made: 10% open water in the channel; 45% willow sp.; 5% valley oak and coast live oak; 5% buckeye; and the remaining 35% various non-native herbs and grasses including vetch, mustard sp., wild oats, ripgut grass, and poison hemlock.

Other species generally observed at the site or identified along the transect included the following: rose sp., sedge sp., California poppy (*Eschscholzia californica*), cottonwood (*Populus* sp.), coyote bush, mugwort sp., fennel, arroyo lupine (*Lupinus succulentus* (?)), cattail, canary grass (*Phalaris canariensis*), Carolina geranium (*Geranium carolinanum*), poison oak (*Toxicodendron diversilobum*), *Epilobium* sp., Milk thistle, *Medicago* sp., boxelder (*Acer negundo*), common sow thistle (*Soncus oleraceus*), walnut (*Juglans* sp.), and blue elderberry (*Sambucus mexicana*).

The native tree and shrub canopy is expected to increase in the future but the herbaceous layer is unlikely to change much in terms of the dominance of non-natives. The willows have

done well, the shrub layer is probably deficient, and the groundcover is abundant (but not native). The overstory vegetation on this site may take another 20 years to mature.

There is some erosion on the banks, especially one area downstream of the riprap, but it is not clear whether this represents a significant problem.

### 3. WEA Scores:

Wildlife = 1.5

Vegetation = 2.1 [Suggest that this be changed to 1.5 due to high cover of non-natives in herbaceous layer]

- Herbaceous (< 1 Meter) [2] [Suggest that this be changed to 0 due to high cover of non-natives]
- Shrub (1-3 Meters) [2.2]
- Trees (> 3 Meters) [2.2]

Buffer = 0

Hydrology = 3

Surrounding Land Use = 1.1

**TOTAL: 7.7** [Suggest change to 7.1]

### III. PERMIT COMPLIANCE:

Criteria:

1. Enhance 3.8 acres of riparian woodland habitat by planting.
2. Tree survival rate 75%, with minimum of 5 years since irrigation.
3. To be counted, trees must show moderate-to-vigorous growth.
4. By year 5, shrubs must cover 75% of ground within mass-planting areas, with minimum of 2 years since irrigation.
5. Channel banks stable, with minimum of erosion.

Status:

Only partial compliance. No monitoring reports. Team estimated only 50% survival of trees and shrubs.

No Corps sign-off.

If no monitoring reports and no clear site planting plan are found, this should be listed as a failure given the performance criteria that 184 trees would survive from 245 trees (= 75% survival). In one area of the project we found 74 trees, 59 of which were live and 15 dead (= 20% survival), but this probably did not represent the entire area planted (see notes in "Vegetation" section on Wetland Assessment Form for more specific information).

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impact Acres = 0.12 and Enhanced Acres = 3.8**. While the enhancement to impacted ratio was large in this case, it appears that this site may be an overall loss given temporal impacts and the likely trauma to the entire creek area from the development site, even though the actual impacted acres was very small in this case.

Unless a record is found of monitoring reports describing where the trees were actually planted and what the overall survival for this site is, then this project should be counted on as a wetland loss.

### V. RECOMMENDATIONS:

1. This site should have some follow-through by the agencies (especially the U.S. ACOE which wrote the permit in 1994). If the survival of the planted trees is really as poor as it appeared from this site visit, then trees should be re-planted, irrigated if necessary, and monitored for 10 years as was required in the original permit.
2. Remove non-native invasive species from the herbaceous layer, especially the poison hemlock.
3. Consider planting willow wattles on exposed bank slope downstream of riprap area on site.

WEA FORM  
 Site #: 10

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Dublin Meadows, Alamo Creek	17167 E 75A	2 0301049

Assessment Date:	Evaluators:	Wetland Types(s):
3/28/03	Breaux, Martindale, Evans, Cochrane, & Benner	Riparian Enhancement

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
9:30 am -- 12:00	1995(?) -- Replanted lost trees

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
3.8 Acres replanted	10S 0595779/ 4175057

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	5% * 3	0.15
Multi-family residential	90% * 1	0.9
Medium volume road	2% * 1	0.02
Small road	3% * 1.5	0.045
	SLU Total	1.1

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	1.5	3
2. Dominant Vegetation Cover* (< 1 meter)	2.1	3
(1-3 meters)	[2] [suggest change to 0]**	[3]
(> 3 meters)	[2.2]	[3]
3. Buffer/Upland	0	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	1.1	3
<b>TOTAL FINAL SCORE</b>	<b>7.7 [or 7.1]</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

\*\*this change would bring the total score for the site to 7.1]

## FIELD & FOLLOW UP NOTES:

### 1. Wildlife Use (For complete lists see wildlife appendices.)

This site has reasonable bird habitat which could be better if there were more natives and if it were not surrounded by development. There is a fence on both sides which is a positive feature in protecting wildlife.

Birds observed included: bushtit, house finch, Audubon's warbler, lesser gold finch, black phoebe, downy woodpecker, nuttall's woodpecker, American robin, hermit thrush, cedar waxwing, scrub jay, Anna's hummingbird, white-crowned & golden-crowned sparrow, house sparrow, European starling, mockingbird.

Note that birds were sampled in the peak morning hours.

Invertebrates included: freshwater clams, mayflies, amphipods

Reptiles: western fence lizard

Mammals: cats

### 2. Wetland Dominant Vegetation

#### Cover

Herbaceous layer is almost entirely non-native grasses but otherwise site ranks well for vegetation with a predominance of willows and, to a lesser degree, oaks.

Some (but not all) of the previously planted trees included: 3 live oaks (no cage); 15 coast live oak surviving in cages; 14 live valley oaks in cages, one dead in a cage and 6 live uncaged; 4 live uncaged buckeyes, 17 live uncaged elderberries; and 14 cages with dead unknown species. [59 live & 15 dead]

Non-natives: vetch, mustard, ripgut grass, wild oats, fennel, poison hemlock.

### 3. Habitat Support/Buffer

Virtually no buffer at all for this site due to small road and multi-family housing up to creek.

### 4. Hydrology

Hydrologic source is likely to remain viable since site depends on flows (urban runoff) from the upper watershed.

Debris lines in trees indicate extremely high flows following previous rains with leaves in some trees up to 20 feet high.

### 5. Surrounding Land Use (SLU)

Most of site surrounded by the housing development which includes houses, small roads, and a large highway. A small area seems to be natural with a hill with oaks across the highway (not contiguous to the site).

## I GENERAL PROJECT INFORMATION

1. **Project Name:** West Branch Mitigation or West Bank Alamo (?)
2. **Project Location:** Southwest Contra Costa County in the Tassajara, Dougherty Valley Section of the County. Site is crossed by the West Branch of Alamo Creek. Drains a portion of the southern slope of the Black Hills south of Mt. Diablo.  
Lat/Long:  
Field GPS: 10S 0594690/ 4182541
3. **U.S. ACOE File Number:** 1723376 [& 17233 E 76?]
4. **SFB RWQCB File No:** WDID 2 0307056
5. **Wetland Type:** Riparian
6. **Project Size and Type:** Creation of 8.4 acres of creek bank and 0.8 acres of creek channel
7. **Project Goals:**
  - (a) planting of 8.4 acres of creek banks and 0.8 acres of creek channel
  - (b) creating a pond/marsh added for subsequent creek impact [not assessed]
8. **Project Description:** Creek re-located to compensate for impacts to 1.9 acres of stream channel and adjacent wetlands associated with the West Branch Residential project in the Dougherty Valley of Contra Costa County.
9. **Years of Required Monitoring:** 5 Years
10. **Years of Monitoring Completed:** 5 Years
11. **Project Permittee:** Shapell Industries
12. **Wetland Assessors:** Benner, Breaux, Cochrane, Evans, Martindale
13. **Wetland Assessment Date:** March 28, 2003 (1:00 -- 2:45 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

The length of this created creek corridor was walked along the pedestrian pathway with some informal transects run perpendicular to the creek. One assessment was conducted from both sides of a bridge where only about 5% of the entire project could be seen. This area appeared to be similar in composition and structure, however, to most of the site except that the two bridges on the project site are the only areas on the creek where rocks have been placed. In addition, one transect was run near the point of the assessment.

### 2. Site Evaluation Description:

From the assessment point the following approximations were observed: 58% willow sp., 14% open water, 7% rocks and cement, 5% red alder (*Alnus rubra*), 2% California rose (*Rosa californica*), 1% rush (*Juncus* sp.), 1% cattail (*Typha* sp.), and the remaining 12% non-native grasses. Other species observed on the site included the following: Trees: California buckeye (*Aesculus californica*), valley oak (*Quercus lobata*), live oak (*Quercus agrifolia/wislizenii*), Northern California black walnut (*Juglans californica* var. *hindsii*), cottonwood (*Populus* sp.), box elder (*Acer negundo*); Shrubs: coyote brush (*Baccharis pilularis*); and Herbs: tule/bulrush (*Scirpus* sp.), mugwort (*Artemisia* sp.), poison oak (*Toxicodendron diversilobium*), California bee plant (*Scrophularis californica*), Italian rye grass (*Lolium multiflorum*), ripgut grass (*Bromus diandrus*), fennel (*Foeniculum vulgare*), black mustard (*Brassica nigra*), wild oats (*Avena fatua*), Harding grass (*Phalaris stenoptera*), milk thistle (*Silybum maritimum*), and poison hemlock (*Conium maculatum*).

The tree canopy of the 10-13 year-old site seems to be developing well and provides good riparian habitat for a residential area, but the understory could be more diverse. The trees are progressing as expected and should reach maturity in another 20-25 years.

### 3. WEA Scores:

Wildlife = 1.5

Vegetation = 1.9

- Herbaceous (< 1 Meter) [0.5]

- Shrub (1-3 Meters) [2.3]
- Trees (> 3 Meters) [3]

Buffer = 0

Hydrology = 3

Surrounding Land Use = 1.8

**TOTAL: 8.2**

### III. PERMIT COMPLIANCE:

Criteria:

1. Plant 8.4 acres of re-located creek bank and 0.8 acres of channel
2. 75% survival of original number of trees

Status:

All annual reports submitted. Both criteria met.  
U.S. ACOE signed off in 1994.

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **1.9 Acres Impacted = and Acres Created = 9.2** (+ 2.5 Acres for created pond/marsh off site which was not assessed for this project.) The created riparian portion of this site appears to be functioning well and should be considered a gain of riparian habitat.

### V. RECOMMENDATIONS:

1. Plant more native shrub species such as toyon (*Heteromeles arbutifolia*) or coffeeberry (*Rhamnus californica*).
2. Control domestic animals.

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project XX	Existing Condition XX	Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
West Branch Residential [or West Branch Alamo Creek]	1723376	2 0307056

Assessment Date:	Evaluators:	Wetland Types(s):
3/28/03	Breaux, Martindale, Evans, Cochran & Benner	Creek bank & channel created

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
1:00 - 2:45 pm	1990 planted, so 13 years since bare ground

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
8.4 ac creek bank & 0.8 ac creek created	10S 0594690/ 4182541

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Single family residential	50% * 1.5	0.75
Low volume highway	50% * 2	1
	SLU Total	1.8

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	1.5	3
2. Dominant Vegetation Cover* (< 1 meter)	1.9	3
(1-3 meters)	[0.5]	[3]
(> 3 meters)	[2.3]	[3]
3. Buffer/Upland	[3]	[3]
4. Wetland Hydrology	0	3
5. Surrounding Land Use	3	3
	1.8	3
<b>TOTAL FINAL SCORE</b>	<b>8.2</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use (For complete lists see wildlife appendices.)**

The site is not really connected to any other habitat, otherwise it would be good habitat. Good, extensive, well-vegetated riparian corridor with all the appropriate components, but still in a residential area. Don't know about the quality of the contiguous corridor but if that is high, then this site would have more value.

Note that this site was assessed in the afternoon when bird activity is expected to be lower than in the morning.

Birds observed: bushtit, myrtle warbler, lesser goldfinch, scrub jay, red-winged blackbird, CA towhee, house finch, song sparrow, mourning dove, orange crowned warbler, Anna's hummingbird, belted kingfisher.

Reptiles: Fence lizard

Invertebrates included 2 kinds of sn

Mammals: ground squirrel hole, racoon tracks, cats.

**2. Wetland Dominant Vegetation**

**Cover**

Most of grass/herb cover of herbaceous layer was non-native except in the creek itself. Understory shrubs are largely missing though the California rose and willows have done well.

Upper story canopy is well developed and healthy with good structural diversity.

**3. Habitat Support/Buffer**

Virtually no buffer because houses and pedestrian trail are so close to riparian corridor.

**4. Hydrology**

The hydrologic source is likely to remain adequate for the vegetation in this riparian corridor.

**5. Surrounding Land Use (SLU)**

About half of site surrounded by houses and the other by a low volume highway.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 12

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Bettencourt Detention Basin [or “Camino Tassajara”]
2. **Project Location:** West Branch of Alamo Creek near Camino Tassajara Rd.
3. **U.S. ACOE File Number:** 17375R76
4. **SFB RWQCB File No:** WDID 2 0307053
5. **Wetland Type:** Riparian (detention basin)
6. **Project Size and Type:** The detention basin is 0.2 acres which is part of a 1.6 acre project. The 1.4 acres that was not assessed consists of riparian enhancement. The part that was assessed is a grassy area with some trees.
7. **Project Goals:** It is not clear which of the project goals pertain only to the small detention basin but it may have been the goal of providing permanent water that will encourage use by some water-breeding amphibians such as tree frogs and toads. Another more general goal for the 1.6 acre project as a whole was to create a riparian zone with appropriate diversity of native trees and shrubs.
8. **Project Description:** It is not known from the project description which portion describes the larger creek enhancement project (1.3 acres) and which describes the smaller created detention basin (0.2 acres).
9. **Years of Required Monitoring:** 5
10. **Years of Monitoring Completed:** 0? [no monitoring reports in U.S. ACOE files?]
11. **Project Permittee:** Contra Costa County Flood Control District
12. **Wetland Assessors:** Benner, Breaux, Cochrane, Evans, Martindale
13. **Wetland Assessment Date:** March 28, 2003 (3:00 – 3:45 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

A fence prevented access to the 0.2 acre detention basin but the entire site could be seen from the car (about 200 feet away).

### 2. Wetland Assessment Description:

From the single vantage point from which the site was assessed we made the following approximations: 30% mud; 30% Fremont cottonwood (*Populus fremontii*) and native willow, 30% cattail, 1% ash (*Fraxinus* sp.), 8% non-native grasses and weeds, and 1% non-native willow.

Trees are doing well but more trees and shrubs could be planted t the site if riparian values are the intended habitat.

### 3. WEA Scores:

Wildlife = 0.5

Vegetation = 2.2 [or 1.4 if shrubs were planted but died.]

- Herbaceous (< 1 Meter) [2]
- Shrub (1-3 Meters) [na] [or 0?]
- Trees (> 3 Meters) [2.3]

Buffer = 1

Hydrology = 2

Surrounding Land Use = 1.2

**TOTAL: 6.9 [or 6.1?]**

## III. PERMIT COMPLIANCE:

Criteria:

1. Plant 0.2 acres within detention basin.

2. 75% survival of plantings

Status:

- No formal monitoring reports received???
- Success criteria only partially met.
- No U.S. ACOE sign-off??

**IV. WETLAND GAIN OR LOSS:**

The Overall Wetland Ratio of Lost Acres to Gained Acres cannot be assessed for this site because the entire site was not evaluated and the performance criteria was unclear as to which applied to which separate parts of the project: **Impacted for Total Project Acres = 1.6 and Total Enhanced Acres = 1.6 with an additional 0.2 Acres Created as the detention basin.** Without assessing the rest of the project, it is impossible to say whether this mitigation project represented a gain or a loss.

**V. RECOMMENDATIONS:**

1. Complete the wetland ecological and compliance assessment at a later date by including the other part of this project with clear indications of what the performance criteria are for each part and what was the target vegetation was at each separate site.
2. Determine whether shrubs died at detention basin site.
3. Plant more native shrubs and trees at the detention basin site.

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Bettencourt Detention Basin [or Camino Tassajara Project]	17375R76	2 0307053

Assessment Date:	Evaluators:	Wetland Types(s):
3/28/03	Breaux, Martindale, Evans, Cochrane & Benner	Riparian (detention basin)

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
3:00 - 3:45 pm	Planted in 1995?

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
0.2	NA

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Multi-family residential	50% * 1	0.5
Medium volume road	50% * 1.5	0.75
	SLU Total	1.25

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	0.5	3
2. Dominant Vegetation Cover* (< 1 meter)	2.2	3
(1-3 meters)	[2]	[3]
(> 3 meters)	[na]	[3]
3. Buffer/Upland	[2.3]	[3]
4. Wetland Hydrology	1	3
5. Surrounding Land Use	2	3
	1.2	3
<b>TOTAL FINAL SCORE</b>	<b>6.9</b>	<b>15</b>

**\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.**

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see wildlife appendices)  
Poor habitat for wildlife because it is very small and surrounded by a highway and residential area.  
  
Birds observed included: American goldfinch, lesser goldfinch, song sparrow, house finch, bushtit, red-winged blackbird.  
Invertebrates included a cabbage white butterfly.

2. Wetland Dominant Vegetation  
Cover  
Herbaceous layer has some cattails and non-native grasses, shrub layer was absent, and tree canopy was low.

3. Habitat Support/Buffer  
A buffer of less than 30 feet.

4. Hydrology  
To function as a detention basin this site probably requires maintenance. There is a very large drain to catch wood.

5. Surrounding Land Use (SLU)  
Poor quality of surrounding land use for any wetland or wildlife function.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 13

A. Restored Vernal Pool On-site

B. Created Vernal Pools Off-site

## I GENERAL PROJECT INFORMATION for both sites<sup>4</sup>:

1. **Project Name:** Fleeman Property [Restored on site] [aka Peabody Road]
2. **Project Location:**
  - A. Restored Vernal Pool On-site is northeast of the intersection of Peabody Road and Whitney Drive, Fairfield, CA.  
**Lat/Long:** 38° 16.876' N/ 121° 58.161' W
  - B. Created Vernal Pools Off-site is ¼ mile north of Flannery Road, east of Hwy 113, south of Dixon, CA.  
**Lat/Long:** 38° 13.329' N/ / 121° 47.537' W
3. **U.S. ACOE File Number:** 21256E95
4. **SFB RWQCB File No:** WDID 2 0348068
5. **Wetland Type:** Restored and created vernal pools
6. **Project Size and Type:** This project consists of 2 parts which were evaluated separately:
  - [A] 0.67 acres of restored vernal pool with a 3 acre buffer on original site of impact (known as “the project area”)
  - [B] creation of 0.95 acres of vernal pools offsite of which 0.76 must be successful (known as “the off site mitigation area”)
7. **Project Goals:** Restore one vernal pool (0.67 acres) on-site which must prove 100% successful and create three vernal pools (0.95 acres) off-site which must prove 80% successful (=0.76 acres). All four vernal pools will be dominated by vernal pool species, have a minimum cover of more than 60%, and will support a minimum of 10 species normally associated with vernal pools.
8. **Project Description:** These two projects are to mitigate for eliminating two vernal pools of 1.4 acres in 1994. The on-site restored vernal pool was excavated down to about one foot above the pre-existing vernal pool. About 300 cubic yards of fill were removed and stockpiled for later use. The off-site created pools were formed by excavating three basins covering about 1.3 acres and applying the soils from the salvaged vernal pools. Construction of all four pools was completed in 1997.
9. **Years of Required Monitoring:** 5
10. **Years of Monitoring Completed:** 5
11. **Project Permittee:** Peabody Road Partners
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Pavlik. Also accompanied by Josh Collins of San Francisco Estuary Institute and Dave Skordal of Gibson & Skordal.
13. **Wetland Assessment Date:** April 7, 2003.
  - A. Restored Vernal Pool On-site (9:30 -- 11:30)
  - B. Created Vernal Pools Off-site (11:45 – 1:00)

## II. ECOLOGICAL WETLAND FUNCTION for both off- and on-site mitigation:

### A. Restored Vernal Pool On-site

A botanical evaluation of this site which provides additional information on vegetation is provided below under #4(a).

#### 1(a). Field Methods:

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<sup>4</sup> Major source for project information: Gibson & Skordal, LLC. 2002. *Mitigation and Monitoring Report Fifth Growing Season, Fleeman Project, Solano County, CA.* Sacramento, CA.

The entire perimeter and interior of the small restored vernal pool was assessed by the team members as well as the upland area that serves as the watershed for the restored pool. The assessment was conducted at a point where all of the restored pool was visible.

### 2(a). Site Evaluation Description

At the time of the assessment (which was too early for some of the flowers) the following approximation of the restored vernal pool was made: 80% smooth goldfields (*Lasthenia glaberrima*), 10% open water; and 5% annual semaphore grass (*Pleuropogon californicus*). The remaining 5% was a mixture of vernal pool species such as coyote thistle (*Eryngium vaseyi*), creeping spikerush (*Eleocharis macrostachya*), slender popcorn flower (*Plagiobothrys stipitatus*); other wetland species such as tall flatsedge (*Cyperus eragrostis*), and non-native invasive species such as broadleaf peppergrass (*Lepidium latifolium*) and curly dock (*Rumex crispis*). Surrounding the pool in the adjacent area were other non-native species such as rattail fescue (*Vulpia myuros*), vetch (*Vicia sativa*) Italian ryegrass and barley (*Hordeum* sp.). These species bordering the pool, especially the ryegrass, do pose a threat to the vernal pool if thatch builds up around the edges and eventually fills in the pool with organic and mineral matter.

### 3(a). WEA Scores:

Wildlife = 1.5

Vegetation = 2.3

- Herbaceous (< 1 Meter) [2.3]
- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer = 2 [note this was raised from "1" to "2" due to an unknown 3-acre surrounding buffer discovered by BMP].

Hydrology = 2

Surrounding Land Use = 1.5

**TOTAL: 9.3**

### 4(a). Additional Botanical Evaluation of Fleeman Property (A) Restored Vernal Pool On-site

**C-S-R Ratings:** Vernal Pool = 2-2-2 Context = 1-1-1

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect circled the edge of the vernal pool, with occasional incursions into the pool bottom. Plant species were noted (although the visit was too early for some species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by David Skordal, of Gibson and Skordal (Sacramento, CA), consultants to Mr. Fleeman (property owner) and Peadbody Road Partners (Berkeley, CA).

**Project Description:** This project covers a 0.73 acre area east of a wire fence that runs parallel, and is adjacent to, Peabody Rd. It is surrounded by a 3 ac buffer (approximately half of the historical watershed of this particular pool according to the consultants) that will remain undeveloped. An adjacent 16 acres of disturbed vernal pools and weedy annual grassland is likely to be developed for housing in the near future. Some portions of the property appear to have been scraped of their topsoil, perhaps as seed bank material to the Fleeman creation project.

In June 1994 the project area (two vernal pools totaling 1.44 acre) was illegally filled in anticipation of development. As partial mitigation, the landowner was required to excavate the pool and restore its vegetation and animal life. In the fall of 1997 the pool was excavated to within a foot of its original bottom by removing nearly 300 cubic yards of material. Aerial photos, taken prior to filling, were used to help establish the original position and shape of the pool. Water accumulation has occurred in every year since excavation, and there was open water (10% of the surface area) during this evaluation.

Monitoring began in spring of 1998. Visual estimates of relative cover were made for all

identifiable species. Dominants were defined as those species having  $\geq 20\%$  relative cover. In addition, each species was given a “Vernal Pool Indicator Status” designation that was determined by their fidelity to the habitat over their known range. “Vernal Pool Endemic” (VPe) taxa are those exclusive to vernal pools, “Vernal Pool Associate” (VPa) taxa are commonly in vernal pools, but also in other wetland types, “Other Wetland” (OW) are mostly found in other wetlands and not usually vernal pools, and “Upland Plants” (UPL) are typical of grasslands or other upland habitats. Data in the monitoring reports does not include cover estimates by species or references to the native/non-native status of those species.

Vegetation recovery was entirely from the excavated seed and rhizome bank, and started within the first year. The pool margins became dominated by semaphore grass, with thick swards of non-native rye grass at slightly higher elevations. Pool bottoms (without standing water) support a dense, almost continuous population of smooth goldfields that is occasionally interrupted by coyote thistle, spikerush and semaphore grass. Maroonspot downingia (*Downingia concolor*), found on other wet portions of the property, was apparently absent from this pool at the time of evaluation. Weeds are invading the pool margin and bottom. The adjacent grassland contains virtually no native grasses and very few native forbs.

**Plant Species Observed in the Enhanced Vernal Pool (incomplete):**

Pygmyweed (*Crassula aquatica*) – native annual forb in pool bottoms  
Tall flatsedge - native perennial graminoid in pool margins and bottom  
Creeping spikerush - native perennial graminoid in pool bottom  
Coyote thistle - native annual forb in pool margins and bottom  
Smooth goldfields - native annual forb in pool margins and bottom  
Broadleaf peppergrass - non-native perennial invading pool margins and bottom - noxious weed that should be controlled  
Italian rye grass – non-native annual grass on pool margins and adjacent grasslands  
Slender popcorn flower - native annual forb in pool margins and bottom  
Semaphore grass - native grass in pool margins and bottom  
Curly dock - non-native forb on pool margins and bottom - invasive weed that should be controlled

**Plant Species Observed in Adjacent Areas (incomplete):**

Black mustard – non-native annual forb on adjacent grassland  
Ripgut grass – non-native annual grass on adjacent grassland  
Red stem filaree (*Erodium cicutarium*) – non-native annual forb on adjacent grassland  
Dove’s-foot geranium (*Geranium molle*) - non-native annual forb on adjacent grassland  
Barley sp. – non-native annual grass on adjacent grassland  
Italian rye grass – non-native annual grass on adjacent grassland  
Wild radish (*Raphanus sativus*) - non-native annual forb on adjacent grassland  
Sheep-sorrel (*Rumex acetocella*) - non-native annual forb on adjacent grassland  
Sour clover (*Trifolium fulcatum*) - non-native, invasive annual forb on adjacent grassland  
Vetch – non-native annual forb on adjacent grassland  
Rattail fescue - non-native annual grass on adjacent grassland

**Vegetation Quality:** Low to medium quality vernal pool vegetation was the result of enhancement activities. Semaphore grass attains a peak absolute cover of 30% in the margins, while smooth goldfields forms thick swards with up to 90% cover. Other pool species contribute another 5-10% in total. The pool has not achieved the species richness or vegetation structure typical for the Fairfield-Dixon region and is also being invaded by non-native species. Italian rye grass is building a thatch at the edge of the pool that will gradually reduce the extent and the quality of margin vegetation. Broadleaf peppergrass is rapidly expanding across the pool bottoms (evidenced by the invasion front around established plants) while curly dock will gradually increase in abundance. The adjacent grasslands are very weedy and will act as a source of potentially invasive species.

**Recommendations:** Invasive, non-native plants in the pool and adjacent area should be controlled, if

not eliminated, to improve habitat quality. Further management, possibly involving controlled burns, mowing, light grazing or all three will be needed to minimize invasion of the pool margin habitat.

**Overall Evaluation:** Project met permit conditions but produced low to medium quality vegetation that hardly enhances local biological resources. Long-term value will depend on intensive management efforts and the effects of adjacent development.<sup>5</sup>

## **B. Created Vernal Pools Off-Site**

A botanical evaluation of this site which provides additional information on vegetation is provided below under #4(b).

### **1(b). Field Methods:**

The 1.4 acres of the three created vernal pools are located on a total project area of about 5 acres. We walked through and along the 3 pools and conducted assessments from site #1 where pools 1 & 2 were assessed and from site #2 where pool 3 was assessed.

### **2(b). Site Evaluation Description**

From our assessment point pools 1 & 2 had the following general composition: 40% smooth goldfields, 25% coyote thistle 15% semaphore grass, 5% maroonspot downingia, 5% sour clover, 2% bare unvegetated ground, 2% curly dock, 1% tricolor monkey flower (*Mimulus tricolor*), and the remaining 5% a mixture of toad rush (*Juncus bufonius*), and slender popcorn flower.

Pond 3 was more weedy with less of the desirable vernal pool species. Only about 10-15% of the pool had target species such as coyote thistle, goldfields, and maroonspot downingia while non-native annual grasses were abundant.

### **3(b). WEA Scores:**

Wildlife = 1

Vegetation = 2.3

- Herbaceous (< 1 Meter) [2.3]
- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer = 3

Hydrology = 2

Surrounding Land Use = 1.5

**TOTAL: 9.8**

### **4(b). Additional Botanical Evaluation of Fleeman Property (B) Created Vernal Pools Off-Site**

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Sources used in BMP Evaluation:

<sup>5</sup> Gibson and Skordal (1996). Restoration Plan, Fleeman Property, Fairfield, CA. Prepared for Mr. Jeff Fleeman.

Gibson and Skordal (1996). Detailed Off-site Vernal Pools Mitigation Plan. Solano County, CA. Prepared for Mr. Jeff Fleeman. Revised from 1995.

Gibson and Skordal (1999). Mitigation Monitoring Report Second Growing Season: Fleeman Project, Solano County, CA. Prepared for Peabody Road Partners, Berkeley, CA. 8 pp.

Gibson and Skordal (2002). Mitigation Monitoring Report Fifth Growing Season: Fleeman Project, Solano County, CA. Prepared for Peabody Road Partners, Berkeley, CA. 10 pp.

**C-S-R Ratings:** Vernal Pool = 2-2-2 Context = 2-2-2

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect traversed the bottoms of three created vernal pools. Plant species were noted and vegetation patterns recorded on a crude sketch map. Project information was provided by David Skordal, of Gibson and Skordal (Sacramento, CA), consultants to Mr. Fleeman (property owner) and Peabody Road Partners (Berkeley, CA), consultants to Mr. Fleeman (property owner).

**Project Description:** This project covers a 1.35 acre area within an extensive complex of vernal pools and pasture land. It has been fenced on all sides to exclude sheep and cattle. Three new pools (numbered 1-3 going north from the gate) were created by excavation in 1997. Soil with vernal pool seed bank was probably removed from the Fleeman property along Peabody Road (see evaluation of Fleeman Enhancement) and spread 4-6 inches deep in the bottoms of the created pools. No standing water was present at the time of this evaluation (although natural pools in the vicinity still did) and pools 1 and 3 seemed especially dry.

Monitoring began in spring of 1998. Visual estimates of relative cover were made for all identifiable species. Dominants were defined as those species having  $\geq 20\%$  relative cover. In addition, each species was given a "Vernal Pool Indicator Status" designation that was determined by their fidelity to the habitat over their known range. "Vernal Pool Endemic" (VPe) taxa are those exclusive to vernal pools, "Vernal Pool Associate" (VPa) taxa are commonly in vernal pools, but also in other wetland types, "Other Wetland" (OW) are mostly found in other wetlands and not usually vernal pools, and "Upland Plants" (UPL) are typical of grasslands or other upland habitats. Data in the monitoring reports does not include cover estimates by species or references to the native/non-native status of those species.

During the 2003 evaluation, pool 2 had vegetation that vaguely resembled that of local vernal pools. The bottom supported scattered individuals of tricolor monkeyflower, pillwort (*Pilularia americana*), and quillwort (*Lilaea scilloides*). Patchy cover was provided by semaphore grass, smooth goldfields, maroonspot downingia and coyote thistle. Upland species, such as lupine, clover, and annual grasses could also be found through the pool, especially in the transition between margin and grassland. Pools 1 and 3 lacked the bottom species and were a mix of sparse vernal pool species and more prevalent upland species. However, the abundant local vernal pool species observed on adjacent properties (e.g. meadowfoam -*Limnanthaceae* sp., pygmyweed, native (?Pacific) foxtail -*Alopecurus saccatus*) were entirely absent or unusually sparse (e.g. wooly marbles-*Psilocarphus brevissimus* var. *multiflous*, fremont goldfields-*Lasthenia fremontii*). In addition, there was an anomalous occurrence of Contra Costa goldfields (*Lasthenia conjugens*), indicating a confusing origin of the innoculating seed bank materials. This could also apply to the tricolor monkeyflower.

**Plant Species Observed in the Created Vernal Pools (incomplete):**

Wild oats – non-native annual grass in pools and on adjacent grassland

Ripgut grass – non-native annual grass in pools and on adjacent grassland

Soft cheat grass (*Bromus hordeaceus*) – non-native annual grass in pools and on adjacent grassland

Yellow star thistle (*Centaurea solstitialis*) – non-native annual forb in pools and on adjacent grassland – noxious weed that should be controlled

Dodder (*Cuscuta* sp.) – native parasitic plant

Maroonspot downingia – native annual forb in pools

Red stem filaree– non-native annual forb on adjacent grassland

Coyote thistle- native annual forb in pool margins and bottoms

Barley – non-native annual grass in pools and on adjacent grassland

Meadow barley (*Hordeum brachyantherum* ssp. *brachyantherum*) – native perennial grass on adjacent grassland

Dwarf rush (*Juncus uncialis*) – native annual graminoid in pools

Fremont goldfields – native annual forb in pool margins and bottoms

Smooth goldfields - native annual forb in pool margins and bottoms

Quillwort – native annual forb in pool bottoms

Italian rye grass – non-native annual grass in pool margins and adjacent grasslands

Tricolor monkeyflower – native annual forb in pool bottoms  
Slender popcorn flower - native annual forb in pool margins and bottoms  
Green popcornflower (*Plagiobothrys greenei*) – native annual forb in pools and adjacent grassland  
Semaphore grass - native grass in pool margins and bottoms  
Curly dock - non-native forb on pool margins and bottom - invasive weed that should be controlled  
Medusahead (*Taeniantherum caput-medusae*) – non-native annual grass in pools and grassland  
Sour clover– non-native, invasive annual forb in pools and adjacent grassland  
Purslane speedwell (*Veronica peregrina ssp. xalapensis*)– native annual forb in pools  
Rattail fescue – non-native annual grass in pools and adjacent grassland

**Plant Species Observed in Adjacent Areas (incomplete):**

Wild oats – non-native annual grass on adjacent grassland  
Ripgut grass – non-native annual grass on adjacent grassland  
Soft cheat grass – non-native annual grass on adjacent grassland  
Yellow star thistle – non-native annual forb on adjacent grassland – noxious weed that should be controlled  
Red stem filaree – non-native annual forb on adjacent grassland  
Barley sp. – non-native annual grass on adjacent grassland  
Italian rye grass – non-native annual grass on adjacent grassland  
Miniature lupine (*Lupinus bicolor*) – native annual forb on adjacent grassland  
Purple needle grass (*Nasella pulchra*) – native perennial grass on adjacent grassland  
Sour clover - non-native annual forb on adjacent grassland  
Johnnytuck (*Triphysaria eriantha*) – native annual forb on adjacent grassland  
Rattail fescue - non-native annual grass on adjacent grassland

**Vegetation Quality:** Low to medium quality vernal pool vegetation was created, depending on the hydrology of individual pools and the precipitation regime in any given year. Pool 2 had the highest quality vegetation, with semaphore grass contributing 20-30% absolute cover in patches, while smooth goldfields could form dense swards with up to 60% cover. Other pool species contributed another 10-40%. Overall, plant species richness was high, but invasion by grassland species contributed a high percentage of total cover in the pools (>60% absolute cover by non-native barley, ripgut grass, rattail fescue, medusahead, wildoats and yello star thistle). Pools 1 and 3 had lower quality vernal pool vegetation due to dominance by grassland species. In contrast, nearby natural pools (such as those found at Jepson Prairie) had low cover by grasses, showy displays of Fremont goldfields and *Linanthus douglasii* \*there is no such plant, maybe mean Douglas meadowfoam (*Limnanthes douglasii*)?, and dense patches of characteristic vernal pool plants (e.g. slender woolly-heads-*Psilocarphus tenellus*, maroonspot downingia).

**Recommendations:** Created pools should be managed to reduce annual grass cover, perhaps including light seasonal grazing and/or controlled burns.

**Overall Evaluation:** Project met permit conditions but produced low or medium quality vegetation that hardly enhances local biological resources. Long-term value will depend on intensive management efforts.

**III. PERMIT COMPLIANCE for both on and off site projects:**

Criteria for all 4 pools:

1. dominance by vernal pool species,
2. minimum cover of more than 60%, and
3. support a minimum of 10 species normally associated with vernal pools.

These criteria appear to have been met, even though the scores given by both the WEA Team and BMP Ecosciences are only low to medium. The discrepancy between meeting the performance criteria and scoring low to medium arises from the fact that native vernal pool species were not required for this site. Therefore, species such as Mediterranean barley (*Hordeum*

*marinum*) and perennial rye grass (*Lolium perenne*) count as vernal pool species because they are typically associated with vernal pools in disturbed areas, and most of the San Francisco Bay region has disturbed areas. The possibility that these species may actually harm the vernal pools by filling them in along the edges during drier years, should be borne in mind.

Future performance criteria should emphasize the presence of *native* vernal pool species as well as require the removal of non-native invasive species.

Status:

- The fifth season monitoring report (12/02 Gibson & Skordal) states that the performance criteria for vernal pool acreage was surpassed at both sites with 0.73 acres of restored vernal pools at the on-site project and 1.35 acres of created vernal pools at the off-site project.
- The U.S. ACOE has not yet signed off on this project.

#### **IV. WETLAND GAIN OR LOSS for both on and off site projects:**

Overall Wetland Ratio of Lost Acres to Gained Acres: **Acres Impacted = 1.4 and Acres Restored and Created = 2.1**. This is an increase in acreage of about 1.5. Given the low to medium scores for this project, however, the overall gain may not represent an improvement in wetland quality. With proper management of the site (mainly controlling invasive species) the new vernal pools may increase in habitat value.

#### **V. RECOMMENDATIONS:**

1. For all 4 pools control aggressive invasive species especially broadleaf peppergrass and curly dock.
2. For future constructed vernal pools in general, try to use local seed sources.
3. Implement controlled grazing (sheep better than cows?) and perhaps fire to keep down annual grasses and invasive wetland species.

WEA FORM

Site #: 13 [A. Restored Vernal Pool  
On-site]

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

<b>Project Name:</b>	<b>Corps Ap. #:</b>	<b>RWQCB WDID #:</b>
Fleeman Property [Restored]	21256 E 95	2 0348068

<b>Assessment Date:</b>	<b>Evaluators:</b>	<b>Wetland Types(s):</b>
4/7/03	Breaux, Cochrane, Evans, Martindale, Pavlik, & Collins	Vernal Pool - Restored

<b>Assessment Time:</b>	<b>Project Age (since breach, fill, completed construction, etc.):</b>
9:30 -- 11:30	1997 Pool Excavated; 5-6 Years

<b>Wetland Acreage (100 acre recommended maximum):</b>	<b>Lat/Long:</b>
0.7	38 16.876'N 121 58.161'W

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Medium volume highway	40% * 1.5	0.6
Low density residential	35% * 2	0.7
Industrial	25% * 1	0.2
	SLU Total	1.5

**FINAL SCORES:**

	<b>This Site's Score for Existing Condition on Day of Assessment:</b>	<b>Highest Possible Score for Existing Condition:</b>
1. Wildlife Utilization	1.5	3
2. Dominant Vegetation Cover*	2.3	3
( < 1 meter)	[2.3]	[3]
(1-3 meters)	[na]	[3]
(> 3 meters)	[na]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	1.5	3
<b>TOTAL FINAL SCORE</b>	<b>9.3</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use (For complete lists see wildlife appendices.)**

Birds observed include: red-winged blackbird, common snipe, greater yellow legs, killdeer, western meadow lark, mourning dove. On the periphery: Wilson's warbler, mocking bird, white-crowned sparrow, American crow, . This is a small habitat surrounded by development.

Mammals: black-tailed jack rabbit

Invertebrates included: dragonfly larvae, mayfly larvae, daphnia, water boatman

**2. Wetland Dominant Vegetation**

Cover

Vegetation assessed as one herbaceous layer. Vernal pool species present but danger of invasion by *broadleaf peppergrass* and *curly dock*.

**3. Habitat Support/Buffer**

This score was revised based on the finding that the restored vernal pool has a 3-acre buffer that will remain undeveloped as part of the project conditions. The adjacent 16 acres might be developed, but at least 3 acres should remain as a buffer.

**4. Hydrology**

Hydrology may not be reliable in the future because the 16 adjacent acres may be developed and the pool is very close to the highway and might receive varying amounts of runoff

**5. Surrounding Land Use (SLU)**

Low score due to surrounding residential area, industrial buildings, and highway.

WEA FORM

Site #: 13 [B. Created Vernal Pools  
Off-Site]

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	XX	Existing Condition
		XX
		Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
Fleeman Property Created Vernal Pools Off-Site	21256 E 95	2 0348068

Assessment Date:	Evaluators:	Wetland Types(s):
4/7/03	Breaux, Martindale, Evans, Cochrane, Pavlik	Created Vernal Pools

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
11:45am -- 1:00 pm	Construction completed in 1997. 5-6 Years Old.

Wetland Acreage (100 acre recommended maximum):	Lat/Long:
0.76 acres of vernal pools on a 1.35 acre parcel	38 13.329' N 121 47.537'W

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Pasture, Rangeland, Ag	100% * 1.5	1.5
	[Note: selected between unimproved pasture at 2.5 and agriculture at 1. Chose a midpoint. Site also lacked diversity in landscape.]	
	SLU Total	1.5

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	1	3
2. Dominant Vegetation Cover* (< 1 meter)	2.3	3
(1-3 meters)	[na]	[3]
(> 3 meters)	[na]	[3]
3. Buffer/Upland	3	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	1.5	3
<b>TOTAL FINAL SCORE</b>	<b>9.8</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

## FIELD & FOLLOW UP NOTES:

### 1. Wildlife Use (For complete lists see wildlife appendices.)

Birds observed included western meadow lark.

Invertebrates observed : native cockroach, dungfly, walking stick, lots of pollinators on the Brodea (?)

Amphibians: tree frog

Mammals: vole; rodent tracks

A small site in the middle of an agricultural/range area at mid-day did not have a lot of faunal activity at the time of the assessment.

### 2. Wetland Dominant Vegetation

Cover

Semaphore grass was dominant.

Also: downingia, goldfields, coyote thistle, wooly marbles.

Potential problem with invasives from rumex, star thistle on edges.

Also with ryegrass, barley sp. , and vulpia if invade pool edges.

### 3. Habitat Support/Buffer

Surrounded by rangeland/agricultural land which serves as big, open space buffer.

### 4. Hydrology

There may be a tendency toward dryness at this site. The soils have not cracked much as vernal pool soils typically do, and the soils don't seem high in clay content.

No water at time of site visit.

### 5. Surrounding Land Use (SLU)

Scoring uncertain for this site since it could be rated low for Ag (1); medium for mixed rangeland, and Ag (2); or high for unimproved pasture/ rangeland (2.5). I selected middle lower end of the range because the landscape lacks diversity which might be more beneficial for wildlife.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 14

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Red Top
2. **Project Location:** 1 mile west of Cordelia, within city limits of Fairfield, adjacent to Jameson Creek (a seasonal stream). Site is bordered by Red Top Rd. to the west, Southern Pacific RR to the north, and I-80 to the east in the City of Fairfield, Solano County.  
**Lat/Long:** 38° 12'20"/ 122° 09'25" (from Mitigation Report)  
**Field GPS:** 38<sup>0</sup>12'417" N/ 122<sup>0</sup>09'329" W. 82' elevation (from hand-held GPS unit at site visit)
3. **U.S. ACOE File Number:** 20196E95
4. **SFB RWQCB File No:** WDID 2 0348054
5. **Wetland Type:** Riparian enhancement and seasonal creation
6. **Project Size and Type:** Riparian enhancement 2.2 acres and seasonal creation 0.4 acres
7. **Project Goals:**
  - a) maintain and restore the riparian and seasonal wetland habitats
8. **Project Description:** This project is on-site mitigation for fill of 0.8 acres for a proposed 500-space park and ride site and a commuter and local bus transfer facility. It appears that the proposed impact site did not happen.
9. **Years of Required Monitoring:** 5 (minimum)
10. **Years of Monitoring Completed:** 5+ ? (Apparently 1996-97 was the first monitoring season, but there is no first year report on file at U.S. ACOE. Final monitoring completed July 2002, but no official Corps confirmation of project completion.)
11. **Project Permittee:** City of Fairfield
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, & Pavlik
13. **Wetland Assessment Date:** April 7, 2003 (3:15 to 4:45 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

A botanical evaluation of this site which provides additional information on vegetation is provide below under #4.

### 1. Field Methods:

The perimeter of this approximately 3 acre site and several transects were walked by the WEA team (see additional methods specific to botanical assessment under #4 below). From the point from which the WEA and Compliance assessments were conducted, about 80% of the project area was visible with a total visible area of about 7 acres.

### 2. Site Evaluation Description (for a more complete list, see #4 below):

There was water in Jameson Creek, but no standing water in the created seasonal wetlands at the time of the site visit. The seasonal wetlands were determined largely by the presence of rushes which are obligate wetland plants but not necessarily indicate recent wet conditions since they tend to persist even after several years of dry winters. So, it was not clear from the site visit whether there will be sufficient water to maintain the seasonal wetlands over the years.

From the assessment point the following layers were visible excluding the well-developed riparian edge that existed before the project and including the trees and shrubs planted for this project: 15% overstory and 85% herbaceous.

Trees included mostly willows and cottonwoods, with a few surviving or preserved oaks (valley oak and coast live oak) and buckeyes. Coyote bush comprised most of the shrub layer which is considered here as part of the overstory. The opposite side of the creek had big leaf maple (*Acer macrophyllum*), coast live oak and California bay laurel (*Umbellularia californica*) all of which might have been more appropriate for this site instead of the cottonwoods and valley oaks.

The herbaceous layer was mostly non-natives with a predominance of Italian ryegrass, including fennel, blackberry (*Rubus* sp.), prickly ox-tongue (*Picris echioides*), ripgut grass, and wild oats. Native grasses and reeds included rush sp. and creeping wildrye (*Leymus triticoides*), purple needlegrass, and horsetail (*Equisitum* sp.). In one small part of the project area with 34 baskets, 8 baskets had dead plants and 2 had highly stressed plants. The remaining 24 baskets had live vegetation. In general, the oaks did not appear to be doing well but the cotton wood trees were healthy. Unfortunately, the non-native black poplar (*Populus nigra*) appears to have been mistakenly planted for the native Fremont cottonwood (this needs final verification from BMP Ecosciences). If left alone, in 20 years this site is likely to have dense cover from the cottonwoods. However, the fast-growing non-native black poplar should be replaced with natives (preferably coast live oaks or other species native to the site; see #4 below).

### 3. WEA Scores:

Wildlife = 1

Vegetation = 1.9

- Herbaceous (< 1 Meter) [1.3]
- Shrub (1-3 Meters) [2.3]
- Trees (> 3 Meters) [2.0]

Buffer = 2

Hydrology = 2

Surrounding Land Use = 2

**TOTAL: 8.9**

### 4. Additional Botanical Evaluation Red Top Road provided by Bruce Pavlik, BMP Ecosciences:

**C-S-R Ratings:** Riparian Woodland = 2-2-2, Seasonal Marsh = 1-1-2, Context = 1-1-2

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was along the southwest edge of the riparian zone of Jameson Creek within the fenced area. Access was afforded by the open ecotone with adjacent disturbed grassland. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map.

**Project Description:** This project focused on creating 0.41 acre of seasonal marsh and enhancing 2.25 acre of riparian woodland along the adjacent edge of Jameson Creek. The wetlands were mitigation for development of a regional transportation center on Red Top Rd (yet to be built) that filled 0.84 acres of seasonal wetlands just north of US 80. Floodwater channels were excavated in 1997 in the disturbed annual grassland that connected with upstream creek levels. Those channels would allow floodwaters to overflow into six shallow basins away from the riparian corridor. Boulder riprap was used to protect the high-energy portions of the natural and new channels. Evidence for flooding was presented for the extremely wet winter of 1997-1998 (>40 " ppt) but not for subsequent years with average or below average rainfall (16-26" ppt). Some standing water has been found in the basins during years with lower precipitation, but its origin may be meteoric. Performance standards for monitoring included sufficient hydrological regime to support dominance by seasonal marsh species, overall cover and cover by hydrophytes, species richness, plant height, plant vigor and plant survivorship (the latter three for riparian enhancements). Monitoring used Braun-Blanquet cover codes (absolute cover) within 8 permanent 100ft<sup>2</sup> plots.

Tree, shrub and graminoid plant materials were installed around the created wetlands in order to enlarge and enhance the riparian transition zone. The origin of those materials was unclear from existing planning documents (which included a planting list on the landscape design map). Some selected species were known from the site (e.g. coast live oak, California bay laurel, arroyo willow (*Salix lasiolepis*), and coyote bush) while others were not (e.g. Northern California black walnut valley oak, Fremont cottonwood, deergrass [*Muhlenbergia rigens*]). A total of 690 trees and shrubs were planted in 1997, including 30 individuals of

cottonwood sp. that were not on the original planting list. Plantings were made in clusters with irregular spacing to provide cover heterogeneity.

During this evaluation, the trees and shrubs had outgrown their protective chickenwire cages, with the cottonwood all exceeding 3 m in height. The oaks and willows were also growing vigorously, attaining heights of 1-1.5 m. One shrub species in particular, coyote bush, appeared to be reproducing well on its own. Absolute cover by all woody species was low (probably < 20% total over the site), but this was difficult to estimate. The seasonal marsh basins were dominated (40-60% absolute cover) by the non-native annual grass Italian rye grass (considered a facultative wetland species), among sparse stands of Baltic rush (*Juncus balticus*) (10-20% overall). There was no standing water in these wetlands or signs of having been flooded this year (average rainfall).

**Plant Species Observed in the Creek Riparian Zone** (incomplete):

Big leaf maple– native tree  
Buckeye– native tree  
Coyote bush – native shrub, transitional to grassland, 50 planted, 398 found 5 years later  
Horsetail sp. – native perennial, understory  
Northern California black walnut – native tree, not native to the site, planted  
Black poplar– *non*-native tree, not native to the site, mistakenly planted instead of the native Fremont cottonwood (which is also not native to the site)  
Coast live oak – native tree, planted  
Valley oak – native tree, not native to the site, planted  
California rose – native shrub, not native to the site, planted  
California blackberry (*Rubus ursinus*)– native vine, understory  
Red willow (*Salix laevigata*) – native tree, planted  
Arroyo willow – native shrub or tree, planted  
California hedgenettle (*Stachys bullata*) - native forb  
California bay laurel– native tree, planted

**Plant Species Observed in Seasonal Marsh/Grassland** (incomplete):

Wild oats– non-native annual grass on adjacent grassland  
Black mustard – non-native annual forb on adjacent grassland  
Ripgut grass – non-native annual grass on adjacent grassland  
Soft cheat grass – non-native annual grass on adjacent grassland  
Red stem filaree – non-native annual forb on adjacent grassland  
Mediterranean barley– non-native annual grass on adjacent grassland  
Meadow barley– native perennial grass on adjacent grassland  
Baltic rush – native graminoid in seasonal wetland, sparse  
Italian rye grass – non-native annual grass on adjacent grassland and seasonal wetland  
Creeping wildrye – native perennial grass on adjacent grassland  
Deergrass – native perennial grass, not native to the site, planted  
Purple needle grass – native perennial grass on adjacent grassland  
Bristly ox-tongue – non-native annual forb on adjacent grassland  
California rose – native shrub, not native to the site, planted  
Vetch – non-native annual forb on adjacent grassland

**Vegetation Quality:** Moderate to low quality, immature riparian woodland and seasonal marshes were created in the project area. The use of native species that were not native to the site, and perhaps the mistaken use of a non-native species of cottonwood (see above) lower the potential for resemblance to native vegetation. It is difficult to know if the seasonal marshes will maintain themselves if flooding and significant water retention remain infrequent. Although Italian rye grass and Mediterranean barley have been designated as a facultative wetland species, they are aggressive, non-native annual grasses that will reduce, if not eliminate, native cover in the long run.

**Recommendations:** Determine if flooding of seasonal wetlands occurs too infrequently or without sufficient water volume and modify channels accordingly. Remove non-native cottonwood, but don't

replace with Fremont cottonwood because it is not native to the site. Remove wire cages from around large, established transplants. Only native species that are native to the site or a set of local reference sites should be planted as part of the restoration.

**Overall Evaluation:** Project met permit conditions but produced moderate or low quality vegetation that may not enhance local biological resources. Long-term value will depend on improving hydrological regime of the seasonal marshes.<sup>6</sup>

### III. PERMIT COMPLIANCE:

(Note: although the intended impacts were in grasslands, the mitigation included both seasonal wetland and riparian zone components.)

Criteria:

1. Enhance 2.25 acres of riparian woodland
2. Create 0.41 acre of seasonal wetland
3. Seasonal wetland: 80% total cover; 67% cover by FAC-OBL species average of 6 plant species per sample site
4. Riparian woodland: 80% of plants at Class 3 height or better (trees – 60”; shrubs 36”) all surviving plants rated as “healthy”

Status:

- “Final” report submitted in 2002.
- No Corps sign off as of date of this report.
- [Determine whether cottonwoods are non-natives and, if so, replant with natives]

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 1.0 and Enhanced Acres = 2.2 and Created Acres = 0.4**. Since the impacted project does not seem to have taken place, this site is likely to represent a gain, though not a large one because most of the acreage is enhancement which is not generally allowed as mitigation. Moreover, many of the species are not native (e.g., the perennial ryegrass and some of the cottonwoods (?)). We assume here that the mitigation project will eventually be used to compensate for wetland impacts, so this site is counted as an anticipated loss of 0.6 acres with an enhancement of 2.2 acres.

This site is unique in that the mitigation project was constructed and monitored before the site was impacted. Whether this was intentional or because the impact project was changed, building and monitoring mitigation sites before allowing impacts to wetlands should be encouraged.

### V. RECOMMENDATIONS:

1. In general, performance criteria for these kinds of sites should generally be required to have *native vegetation for at least 5 years*. This would require that perennial ryegrass be kept out of restoration sites in order to allow planted natives to gain a stronghold.
2. For this particular site, remove cages on surviving vegetation.
3. For this site, determine if the cottonwood planted are actually native. If not, replant.

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<sup>6</sup> The following sources were used in the BMP evaluation:

Zentner and Zentner (1994). Submittal for NWP Verification. Mitigation Plan, Attachment G. Plant List

Zentner and Zentner (1999). Red Top Road Second Year Monitoring Report. Project No: 570 CPF, Prepared for City of Fairfield, Fairfield, CA.

Zentner and Zentner (2002). Red Top Road Fifth and Final Year (2002) Monitoring Report. Project No: 570 CPF, Prepared for City of Fairfield, Fairfield, CA.

WEA FORM  
 Site #: 14

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/> XX	Existing Condition <input checked="" type="checkbox"/> XX	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Red Top	20196 E 95	2 0348054

Assessment Date:	Evaluators:	Wetland Types(s):
4/7/03	Breaux, Cochrane, Evans, Martindale, & Pavlik	Riparian Enhancement Seasonal Creation

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
3:00 -- 4:45	1997 (?)

Wetland Acreage (100 acre recommended maximum):	Lat/Long:
Riparian 2.25 Acres Seasonal 0.4 Acres	38 12.417 / 122 09.329

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	30% * 3	0.9
Unimproved pasture/rangeland	30% * 2.5	0.75
Railroad	30% * 1	0.3
High volume highway	10% * 1	0.1
SLU Total		2

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	1	3
2. Dominant Vegetation Cover* (< 1 meter)	1.9	3
(1-3 meters)	[1.3]	[3]
(> 3 meters)	[2.3]	[3]
3. Buffer/Upland	[2.0]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	2	3
<b>TOTAL FINAL SCORE</b>	<b>8.9</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use (For complete lists see wildlife appendices.)**

Site is close to a highway and railroad and has no canopy so generally scored low for wildlife.

Some birds observed: redwinged blackbird, scrub jay, bushtit, CA towhee, rofus towhee, brewer's blackbird, white crowned sparrow, American crow, American goldfinch, black phoebe, turkey vulture.

Invertebrates included: CA. Ringlet butterfly, tick, cricket, black grass bugs

Reptiles: fence lizard

Mammals: black tailed hare

**2. Wetland Dominant Vegetation**

Cover is developing; tree layer is not well developed yet and should not have been planted with cottonwoods, valley oaks, and walnuts but rather with coast live oaks and bays which would be more appropriate for this site.

**3. Habitat Support/Buffer**

Adjacent buffer is between 30 and 300 feet and about a third is a good riparian border.

Good fence.

**4. Hydrology**

Hard to know if the hydrologic source is dependable since we don't know what is going on upstream for this project. There may not be enough flood water to maintain the seasonal wetlands. Rush is slow to die out so its presence on site may not indicate recent flooding.

Perennial rye grass is probably here to stay with or without flooding.

Swales and dams built to keep site wet but man not be sufficient to do that.

**5. Surrounding Land Use (SLU)**

Riparian edge is good; and pasture provides open space. Highway and railroad, however, detract from habitat value

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 15

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Pittman
2. **Project Location:** Cordelia Road, east of junction with Pittman Rd., Fairfield, CA. East of Dan Wilson Creek  
**Lat/Long:** 38°12.747 N/ 122°07.605 W. Elevation = 31 feet
3. **U.S. ACOE File Number:** 19535E95
4. **SFB RWQCB File No:** WDID 2 0348057
5. **Wetland Type:** Fresh/Brackish
6. **Project Size and Type:** 0.2 Acres Enhanced (proposed)
7. **Project Goals:** ?? Enhance 0.2 acres of fresh/brackish marsh (no more information available)
8. **Project Description:** No documentation could be found in the U.S. Army Corps of Engineers office for this site beyond the requirement that 0.2 acres be enhanced as mitigation for filling that amount to install a culvert and road.
9. **Years of Required Monitoring:** ??
10. **Years of Monitoring Completed:** 0?
11. **Project Permittee:** J.E. Schuricht & Associates (Concord, CA)
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, & Pavlik.  
Because the mitigation project does not appear to have occurred, only two assessments were conducted for this site: (1) BMP's botanical assessment and (2) the compliance evaluation. No Wetland Ecological Assessment was conducted by the WEA team since no project was carried out. While there is some wetland vegetation, predominantly cattails and bulrush/tules (*Scirpus californicus*) with a few willows, these are suspected to be pre-existing and not part of the proposed enhancement project. The entire freshwater area is surrounded by a weedy transitional area and houses
13. **Wetland Assessment Date:** April 7, 2003 (5-5:30 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. WEA Scores: NONE GIVEN BECAUSE SITE NOT EVALUATED

Wildlife =

Vegetation =

- Herbaceous (< 1 Meter) [NA]
- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer =

Hydrology =

Surrounding Land Use =

**TOTAL:** NA

### 2. Botanical evaluation of Pittman provided by Bruce Pavlik, BMP Associates:

**C-S-R Ratings:** Palustrine Marsh = 1-1-2 (existing) Context = 1-1-1 (existing)

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was across the southern portion of the marsh, with access afforded by Cordelia Rd. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map.

**Project Description:** A 0.2 acre brackish to freshwater marsh enhancement that was never

performed by J.E. Schuricht & Associates (Concord, CA). The area is east of Dan Wilson Creek and was supposed to enlarge the eastern edge of a natural (?), freshwater marsh. The action was required as mitigation for filling an equal area of marsh in order to install a culvert box with road crossing over the creek.

During the 2003 evaluation, the eastern edge of the existing vegetation (cattail, bulrush/tules, and willow) was very dry and weedy. Obviously, no excavation and consequent improvement in water table had taken place and there was no documentation (e.g. design, monitoring reports) to that effect in Army Corp of Engineers files.

#### **Plant Species Observed in the Existing Marsh:**

Shining willow (*Salix lucida lasiandra*) – native shrub or small tree, a few large individuals  
Bulrush/tule (*Scirpus californicus*) – native graminoid, dense, matted, monodominant in patches, creating dense thickets surrounding the creek  
Broad-leaved cattail (*Typha latifolia*) – native graminoid in dense patches surrounding the wetland

#### **Plant Species Observed in Adjacent Areas (incomplete):**

Coyote bush – native shrub on adjacent grassland  
Ripgut grass – non-native annual grass on adjacent grassland  
Red stem filaree – non-native annual forb  
Fennel – non-native invasive perennial herb – noxious weed that should be controlled  
Barley sp. – non-native annual grass on adjacent grassland  
Italian rye grass – non-native annual grass on adjacent grassland  
Curly dock- non-native forb - invasive weed that should be controlled  
Vetch – non-native annual forb

**Vegetation Quality:** Low quality freshwater marsh, degraded by invasion from adjacent disturbed grassland, exists on the project site. Absolute cover by *Scirpus* and cattail were high (75-100+ % total), interrupted by a few tall willows. Adjacent areas were weedy and unmanaged and would act as sources of potentially invasive species if changes in marsh hydrology and sediment levels occurred.

**Recommendations:** The project should have been performed or exchanged for off-site mitigation measures.

**Overall Evaluation:** Project does not meet permit conditions. Even if the project were performed, the surrounding landscape, which includes ornamental trees and shrubs, as well as intensive housing development, might undermine its ecological value to some extent.<sup>7</sup>

### **III. PERMIT COMPLIANCE:**

The U.S. ACOE is further investigating the background of this project including any performance criteria that may exist for it. It appears that there was no mitigation project carried out. If there was, in fact, no project carried out, then this project should receive a zero for compliance and be further investigated by the U.S. ACOE.

Status:

US. ACOE be following up on why there was no project

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<sup>7</sup> J.E. Schuricht & Associates (1993). Portions of a Plan on file at ACOE offices, San Francisco, CA.

J.E. Schuricht & Associates (1996). Letter to ACOE offices, requesting extra time to complete authorized work. On file ACOE offices, San Francisco, CA.

**IV. WETLAND GAIN OR LOSS:**

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 0.2 and Proposed Enhanced Acres = 0.2**. Since this site does not appear to have had any enhancement at all, the wetlands impacted for the culvert and road appear to represent a total loss.

**V. RECOMMENDATIONS:**

1. The U.S. Army Corps of Engineers is investigating this site and will deal with the apparent lack of compliance here.

WEA FORM

Site #: 15: NO ASSESSMENT DONE BECAUSE SITE HAD NOT BEEN IMPROVED AS MITIGATION

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project XX??	Existing Condition	Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
Pittman	19535 E 95	2 0348057

Assessment Date:	Evaluators:	Wetland Types(s):
4/7/03	Breaux, Martindale, Evans, Cochrane	Brackish/freshwater

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
5 pm to 5:30 pm	NEVER DONE?

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
0.2 Acres Enhanced	38 12.747/ 122 07.605

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area		
Unimproved pasture/rangeland		
Low intensity commercial (marina)		
Improved pasture		
	SLU Total	

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization		3
2. Dominant Vegetation Cover* (< 1 meter)		3
(1-3 meters)		[3]
(> 3 meters)		[3]
3. Buffer/Upland		3
4. Wetland Hydrology		3
5. Surrounding Land Use		3
<b>TOTAL FINAL SCORE</b>	<b>0</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use

2. Wetland Dominant Vegetation  
Cover

3. Habitat Support/Buffer

4. Hydrology

5. Surrounding Land Use (SLU)

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 16

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Calera Creek Wetland, City of Pacifica
2. **Project Location:** Lower Calera Creek, west of Highway 1, Pacifica, CA.  
**Lat/Long:**  
**Field GPS:** 37°36.919' N/ 122°29.524' W [Note 2 elevations: 22 feet & 60 feet]
3. **U.S. ACOE File Number:** 201471S
4. **SFB RWQCB File No:** WDID 2 0341052
5. **Wetland Type:** Riparian & Freshwater wetland
6. **Project Size and Type:** 8.0 acres of restored riparian and seasonal wetlands with ponds for red-legged frog habitat (or for snake??)
7. **Project Goals:**
  - (a) Create a relatively natural flow regime for the restored portion of Calera Creek that will accommodate the additional discharge from the water recycling treatment plant
  - (b) Increase surface roughness on the site
  - (c) Improve water quality by increasing the residence time of water within the waters/wetland ecosystem
  - (d) Install a fully functional, site-adapted, and self-maintaining mosaic of forest, scrub-scrub, and persistent emergent wetland vegetation
  - (e) Establish a compositionally and structurally complex ecosystem with attributes important to wildlife
8. **Project Description:** This restoration project was required for impacts to 7.1 acres of riparian and pond habitat caused by constructing a wastewater treatment plant and relocating Calera Creek. In addition 2 ponds which served as habitat for San Francisco garter snake and its prey (red-legged and tree frogs) were filled by previous property owners. The mitigation project requires a 10-year vegetative and restocking monitoring program to measure the success of the re-created riparian and pond habitats.
9. **Years of Required Monitoring:** 10 Year Period with quantitative analysis and reporting required at years 2000, 2001, 2002, 2007, and 2009.
10. **Years of Monitoring Completed:** 3 Years (2000 -- 2002)
11. **Project Permittee:** City of Pacifica
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Pavlik & Suer. Met David Gromm, Peggy Fielder, and Lyndon Lee on site.
13. **Wetland Assessment Date:** April 9, 2003 (1 pm – 4:45 pm)

## II. ECOLOGICAL WETLAND FUNCTION:

This site has an additional WEA score provided by Lynn Suer to test the repeatability of the assessment method which she conducted without knowledge of the assessment team's scoring or discussion. The WEA Team's scores are under 3(a) and the outside assessor's scores are under 3(b). A botanical evaluation of this site which provides additional information on vegetation is provided below under #4.

### 1. Field Methods:

Approximately 90% of the perimeter of the 8 acre site was walked and the assessment took place from a hill where about 80% of the mitigation project site was visible. (About 16 acres were graded at the site and visible from the assessment point, but only 8 acres was part of the mitigation project. This assessment evaluated only the 8-acre mitigation site).

### 2. Site Evaluation Description:

From the assessment point the following rough approximations were made: 7% open water (creeks and ponds which were not completely visible but known to exist because of the walk-through); the emerging tree layer (some still less than 3 meters high) consisted of about 40% willows, 22% young red alders; the shrub layer was about 5% coyote bush, 1% red elderberry (*Sambucus racemosa*); the herbaceous layer was 10% bulrush (*Scirpus* sp.), 1% cattails; and the upland transitional area was about 15% of mostly non-native grasses. The transitional area ended abruptly into weedy areas which included poison hemlock, hairy pampas grass (*Cortaderia jubata*), and jointed charlock (*Raphanus raphanistrum*). Native species appeared to cover about 75% of the site and its surrounding area.

**3 (a) WEA Scores:**

Wildlife = 2.5

Vegetation = 2.4

- Herbaceous (< 1 Meter) [1.6]
- Shrub (1-3 Meters) [2.6]
- Trees (> 3 Meters) [3]

Buffer = 3

Hydrology = 3

Surrounding Land Use = 2.2

**TOTAL: 13.1**

**4. Additional Botanical Evaluation of Calera Creek project provided by Bruce Pavlik, BMP Ecoscience:**

**C-S-R Ratings:** Riparian Forest = 3-3-2, Palustrine Marsh = 3-3-3, Context = 2-2-2

**Evaluation Method:** One transect was walked and plant species/vegetation characteristics observed. The transect was along the northern edge of the riparian zone of Calera Creek, from the sewage treatment facility to the mouth at the beach. Access was afforded by the open ecotone with adjacent disturbed grassland. Plant species were noted (although the visit was too early for most species to have flowered) and vegetation patterns recorded on a crude sketch map. Project information was provided by Drs. Lyndon Lee and Peggy Fiedler, the principle consultants on the project (L.C. Lee and Associates) for the City of Pacifica.

**Project Description:** This project covers a 16 acre area between Highway 1 and the Pacific Ocean, in the vicinity of an abandoned limestone quarry. An adjacent 12 acres of uplands provides disturbed grassland habitat for San Francisco Garter Snake. A new bed and floodplain surface for the creek were designed (beginning in 1990) and constructed (grading began in 1995) to replace a straight, deep channel that had long been in existence. An extensive survey of regional reference sites (40 creeks with 56 sites total) had been conducted to provide information on hydrology, microtopography, and vegetation. In addition, a U.S. Coastal Survey map (1853) documented that Calera Creek had supported dense thickets of willow (probably tree willows, such as Shining willow). Consequently, an arching, sinuous bed, with microtopographic depressions and two adjacent palustrine marshes (ponds) were installed. The ponds, an anomalous geomorphic feature in the region, were required mitigation for destruction of red-legged frog habitat by the landowner. A concrete culvert box/bridge was installed approximately 2/3's of the way to the beach in order to retard downcutting above the limestone step in the underlying bedrock. The creek becomes wide and slow behind the low dunes and bluffs near its mouth, creating another low-energy palustrine marsh before disappearing into bedrock clefts at the beach. Most of the water in the creek comes from the tertiary treatment sewage facility operated by the city (discharging at a rate of 3.3 million gal/day), which is in addition to that contributed by the adjacent watershed (3 mi<sup>2</sup>, a mix of residential, commercial and park lands). Over 60,000 yd<sup>3</sup> of topsoil were supplemented by thousands of tons of coffee grounds, rice hulls, sewage sludge and wood chips.

Plant materials were salvaged from the old channel or collected locally. Three

nurseries were used, often staffed with volunteers, for the two years of propagation involving more than 130,000 containers (1 gal worked best overall) of 30 species. Outplanting by volunteers and contract crews took approximately four months and began in June of 1999. Instead of a strict planting design, the area was divided into planting polygons. Each polygon was assigned a composition appropriate to its location, but the actual placement of plants within the polygon was random. Shifting the creek from the existing channel to the new bed was done gradually to provide water for the plantings but also to allow migration of animals to the newly-established habitat. A rainbird-type irrigation system was installed and was run for the first two years. Monitoring of hydrological, topographic, vegetation, and wildlife components is ongoing. A total of 33 permanent vegetation monitoring plots have been installed to determine if project standards (e.g. 59% native tree cover) will be met. The rough cost of permitting, design, grading, planting and monitoring (5 years) is approximately 2 million dollars.

During this evaluation, the tree and shrub layers along the new Calera Creek had exceeded 3 m in height in many places, with patches of bulrush along the water among the dense woody growth. Absolute cover by red alder and shining willow have each exceeded 25%, while that of sitka willow (*Salix sitchensis*) exceeded 40% along the riparian margins. The ponds had a dense floating cover of waterferns (*Azolla filiculoides*) and were surrounded by thickets of bulrush and cattail. Coyote bush was often transition to adjacent areas of disturbed north coastal prairie that had been enriched with hydroseedings of native grasses and forbs. The creek below the bridge was less extensively covered do to greater exposure to wind and salt spray (establishment and growth had been less successful). The lowest portion of the creek had shallows dominated by low bulrushes and herbaceous perennials. All plant assemblages had a complex, natural appearance, even at this early stage of canopy development.

**Plant Species Observed in the Creek Riparian/Marsh Zone (incomplete):**

Red alder - native tree, planted away from the creek, often with shining willow  
Waterfern – native aquatic fern, floating in ponds  
Coyote bush – native shrub, transitional to grassland  
Brass buttons (*Cotula coronopifolia*) – non-native perennial forb in wetland areas  
Rush sp. – scattered along the wetland margin  
Pacific Oenanthe (*Oenanthe sarmentosa*) – native perennial forb in wetland areas  
Cinquefoil (*Potentilla*) sp. – native perennial forb in wetland areas  
Shining willow– as shrubs and a few large individuals, some of which had been salvaged and transported as trees to the site  
Sitka willow– dominant, in dense thickets along most of the creek especially towards outside edge  
Red elderberry - native shrub, transitional to grassland  
Bulrush/tule (*Scirpus californica*) - dense, matted, monodominant in patches, creating dense thickets surrounding the creek  
Common threesquare (*Scirpus pungens*) – native perennial graminoid in wetland areas  
Broadleaved cattail – sparse, along lowest elevations in the vicinity of the ponds

**Plant Species Observed in Adjacent Areas (incomplete):**

Black mustard – non-native annual forb on adjacent grassland  
California brome (*Bromus carinatus*) – native perennial grass on adjacent grassland  
Ripgut grass – non-native annual grass on adjacent grassland  
Poison hemlock – non-native forb on adjacent grassland and riparian ecotone- noxious weed that should be controlled  
Hairy/smooth pampas grass large individuals in the adjacent grasslands - noxious weed that should be controlled  
Red stem filaree – non-native annual forb on adjacent grassland  
Fennel– non-native invasive perennial forb– noxious weed that should be controlled

Barley sp. – non-native annual grass on adjacent grassland  
Meadow barley– native perennial grass on adjacent grassland  
Italian rye grass – non-native annual grass on adjacent grassland  
Purple needle grass – native perennial grass on adjacent grassland  
Bristly ox-tongue – non-native annual forb on adjacent grassland  
German-ivy (*Senecio mikanioides*) – non-native perennial vine in adjacent grasslands - noxious weed that should be controlled  
Vetch – non-native annual forb on adjacent grassland

**Vegetation Quality:** High quality, immature riparian forest and scrub were created in the project area. They have the diversity and spatial complexity that allows resemblance to reference sites, even though canopy closure is still years away. The transition from inland forest to backshore wetland is particularly convincing, aided by natural gradients of wind and salt spray. Absolute cover by willow sp. was moderate (25-60+ %), interrupted by patches of Scirpus, alder (*Alnus*), and coyote bush. The wetlands provided open water habitat rimmed with thickets of Scirpus, cattail and Pacific oenanth. Cover by non-native species in these habitats is low and patchy at present. Adjacent uplands, however, were fairly weedy and could act as sources of potentially invasive species. Patches of hydroseeded native grasses (meadow barley, purple needle grass) near the treatment plant were of higher quality, demonstrating the potential for upland restoration.

**Recommendations:** Invasive, non-native plants in adjacent areas should be controlled, if not eliminated, to improve habitat quality at the edge of the riparian zone. Additional hydroseeding of native grasses in the riparian-grassland transition would provide an additional wildlife enhancement.

**Overall Evaluation:** Project met permit conditions and produced valuable vegetation that enhances local biological resources. Long-term value will depend on treatment plant operation, weed control and adjacent development. <sup>8</sup>

### III. PERMIT COMPLIANCE:

#### Criteria (partial list):

##### 1. Restore 8.0 acres of riparian and pond habitat

2. Stream geomorphology: meet targets for bankfull width, depth, and width:depth ratio based on Rosgen (1994);
3. Water quality: meet standards for pH, conductivity, oxygen, turbidity, coliforms, phosphorus, nitrogen, and copper
4. Vegetation: meet the following targets:
  - (a) Percent cover of native trees greater than 59%
  - (b) Percent cover of native shrubs greater than 21%
  - (c) Percent of planted trees and shrubs surviving greater than 70%
  - (d) Percent of native individuals in each stratum >75%
  - (e) Establish a compositionally and structurally complex ecosystem with attributes important to wildlife.

#### Status:

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L.C. Lee & Associates, Inc. (1995). Application for Nationwide Permit 26: Headwaters and Isolated Waters Discharges including Predischarge Notification. Prepared for City of Pacifica, Pacifica, CA

L.C. Lee & Associates, Inc. (2002). Year 2: 2001 Compliance Monitoring Report, Calera Creek Wetland and Riparian Ecosystem Restoration and Water Recycling Site. Prepared for City of Pacifica, Pacifica, CA.

- The monitoring is not complete. This site was permitted in 1996 but design and construction was not completed until 1999. The site was evaluated by the WEA Team during the fourth of a ten-year monitoring period so it is still young and cannot be assessed for complete compliance at this time. However, it is progressing well and some of the performance criteria have already been met. The geomorphological performance criteria should be closely watched during the remaining monitoring period to determine their suitability and overall success.
- Note that the vegetation performance criteria for this project are unique and rather odd (e.g., “21%” instead of 20%) because the design template was based on looking at over 50 sites and averaging various performance metrics from those sites. The method used for measuring the reference sites was the “hydrogeomorphic method” (HGM) which has not been widely tested in or outside of California primarily because of its complexity and the expense of having to monitor numerous reference sites.
- This project has produced timely, informative, and well-illustrated monitoring reports for the first 3 years.

#### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 7.1 and Restored Acres = 8.0**. It is too early to tell whether this habitat will be successful. The ratio of gain to loss (1.1) is low, and does not allow for the high temporal losses associated with natural riparian habitats. The quality of the impacted acreage is not known here but the low mitigation ratio allowed may reflect what was considered poor riparian habitat in the late 1980’s or early 1990’s when this project was designed. Or, the fact that a public agency was required to provide a large wastewater treatment plant and could not afford the expense of more mitigation, may account for the relatively low mitigation ratio. This site is expected to result in an increase of 0.9 acres of wetlands.

#### V. RECOMMENDATIONS:

1. In cases where the HGM approach is used for project design as for this project, the quality and quantity of vegetation and wildlife habitat in addition to the success of the geomorphology should be compared to other projects that used different design templates. In cases where HGM is used to evaluate project success, the results of the evaluations should be performed by different evaluators and at different seasons in order to test the repeatability of the assessment method.
2. Control or remove non-native invasive species such as pampas grass, Himalayan blackberry (*Rubus discolor*), German ivy, fennel, poison hemlock. Note that the 2002 monitoring report also lists nasturtium (*Tropaeolum majus*) as a plant that should be eradicated.
3. Control feral cats and dogs.

WEA FORM

Site #: 16

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Calera Creek Wetland, City of Pacifica	20147S36	2 0341052

Assessment Date:	Evaluators:	Wetland Type(s):
4/9/03	Breaux, Martindale, Evans, Cochrane	Riparian & Seasonal

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
1 pm to 4:45 pm	Monitoring began in 2000 so 3 years old at time of assessment

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
8 Acres	37 36.919/ 122 29.524

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Disturbed coastal scrub & grassland	80% * 2.5	2
Old abandoned quarry	10% * 1	0.1
Low intensity commercial	5% * 2	0.1
Wastewater treatment plant	3% * 0	0
Medium volume highway	2% * 1.5	0.03
	<b>SLU Total</b>	<b>2.23</b>

**FINAL SCORES:**

	<b>This Site's Score for Existing Condition on Day of Assessment:</b>	<b>Highest Possible Score for Existing Condition:</b>
1. Wildlife Utilization	2.5	3
2. Dominant Vegetation Cover*	2.4	3
(< 1 meter)	[1.6]	[3]
(1-3 meters)	[2.6]	[3]
(> 3 meters)	[3]	[3]
3. Buffer/Upland	3	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	2.2	3
<b>TOTAL FINAL SCORE</b>	<b>13.1</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

**1. Wildlife Use (For complete lists see wildlife appendices.)**

This site provides good riparian and wetland habitat for wildlife with additional potential from the surrounding open space, chaparral, and coastal scrub. The existing wetland exhibits moderate evidence of native wildlife use. Three listed species are associated with this site: San Francisco garter snake, red-legged frog, and the yellow throat.

Some bird species observed included: common yellowthroat, black phoebe, song sparrow, red-winged blackbird, bewick's wren, brown-headed cowbird, Anna's hummingbird, sharp-shinned hawk, killdeer, black oyster-catcher.

Amphibians observed: 3 frogs (5" - 6" possibly red-legged frogs)

Reptiles observed: terrestrial garter snake

Mammals observed: ground squirrels, pocket gopher, ferral cats, humans with or without dogs

Some Invertebrates observed: snails, stonefly larvae, blackfly larvae, damselfly, aphid, leaf hopper, CA. Buckeye, bumble bee, lady beetle, spider.

**2. Wetland Dominant Vegetation**

**Cover**

The herbaceous layer (< 1 meter) received a low score because of the high amount of invasive species notably, German ivy, poison hemlock, and stinging nettles (*Urtica dioica*). \*I am not positive this is the species meant but that's my guess with the given clues

The shrub layer (1-3 meters) scored higher because the composition, vigor, reproductive status, and structural diversity of native species were all appropriate to the habitat types being restored. Pampas grass could be threat in the future.

The tree layer (> 3 meters) is still very young (about 3 years old) but is showing very low non-natives and good regeneration and structural diversity of natives

**3. Habitat Support/Buffer**

The adjacent buffer to the site averages greater than 300 feet and contains a high number of natives including sage (*Salvia* sp.), coyote bush, soft chapparal, and poison oak.

Note: the potential for the land to be developed should be investigated. If developed, the site could score much lower for this metric.

**4. Hydrology**

The hydrologic regime appears to be adequate to maintain a viable wetland/riparian system at this site. Plans exist to redesign the bridge area if the adjacent land can be purchased, and the wetland and creek area will be expanded.

If any future problem, could be too much water. Recommend increasing stream length within floodplain.

There is natural flow upstream of the treatment plant and the plant provides water to the site. The main threat would be excess water from storms. The hydrologic source seems reliable because if there are any plant failures, the upstream watershed can provide water.

**5. Surrounding Land Use (SLU)**

Most of the site is surrounded by disturbed coastal scrub and grasslands so it scores relatively high for this metric.

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	Existing Condition	Proposed Condition

Project Name:	Corps Ap. #:	RWQCB WDID #:
Calera Creek, City of Pacifica	201471S	2 0341052

Assessment Date:	Evaluators:	Wetland Types(s):
4/9/03	Lynn Suer	Riparian & Freshwater

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
1 to 4:45 pm	3 years

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
8.0 acres	37 36.919'N 122 29.524'W

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	70% * 3	2.1
Low volume highway	10% * 1.5	0.15
Single family residential ??	15% * 1.5	0.2
Quarry	5% * 1	0.05
	SLU Total	2.5

[note some mistakes corrected after discussion with L. Suer ]

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2.5	3
2. Dominant Vegetation Cover*	2.5	3
( < 1 meter)	[2]	[3]
( 1-3 meters)	[3]	[3]
( > 3 meters)		[3]
3. Buffer/Upland	2.5	3
4. Wetland Hydrology	2	3
5. Surrounding Land Use	2.5	3
<b>TOTAL FINAL SCORE</b>	<b>12</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use

Red-legged frog, CA garter snake, red-winged blackbirds, herons, song sparrows, swallows

2. Wetland Dominant Vegetation

Cover

Tules, cattails, aquatic floating plants

3. Habitat Support/Buffer

No trees. Shrubs are willows & alders

4. Hydrology

3 cfs from water ?, including GGNRA, residential area and coastal hills

5. Surrounding Land Use (SLU)

Lynn's sheet had "WQ Input " for this which was not included in the final field forms, but uses the same categories as "Surrounding Land Uses"

She wrote: " 3.3 mgd from Pacifica sewage treatment plant and runoff from adjacent hill which is captured in concrete ditch and passed through swales."

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 17

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Berlex Biosciences
2. **Project Location:**  
**Lat/Long:** 37° 59'00"/ 122° 20' 29"  
**Field GPS:** [NA. Estimated to be 4160624 Northing and 0570371 Easting for UTM Zone 10]
3. **U.S. ACOE File Number:** 20000 E 76
4. **SFB RWQCB File No:** WDID 2 0307063
5. **Wetland Type:** Perennial (intended as seasonal but hit permanent seep)
6. **Project Size and Type:** Preserved 0.1 acres and created 0.05 acres of perennial freshwater wetlands.
7. **Project Goals:** To create a seasonal wetland with willows.
8. **Project Description:** This project created a perennial wetland by filling some old tire ruts, removing some fill, and planting willows for impacts to 0.07 acres of seasonal wetlands that were filled due to expansion of the facility (road, building, parking lot).
9. **Years of Required Monitoring:** 5 Years.
10. **Years of Monitoring Completed:** 5 Years. Project implemented in December 1994, monitored for 5 years, and signed off on in December 2000. So the site was about 8 years old at the time of the site evaluation.
11. **Project Permittee:** Berlex Biosciences, Inc.
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale. Vicky Reynolds, the project consultant, accompanied us on the site assessment.
13. **Wetland Assessment Date:** April 10, 2003 (9 am – 11:15 am)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

100% of the perimeter and several passages through this very small site were walked by the assessment team. One vegetation transect was run. The assessment was conducted from a relatively high vantage point from which 100% of the mitigation site was visible (This site was a total of 0.17 acres, 0.1 acre of which was preserved wetlands and 0.07 acres was created. Note that a little more was created than the original intended 0.05 acres).

### 2. Site Evaluation Description:

The total for this study area assessed was extremely small, in fact, this was the smallest project of the 20 selected. From our vantage point the approximate native cover was observed: 60% cattails, 30% willows, 2% rushes 1% coyote bush, and 1% open water. In addition there was about 6% non-natives including bull thistle (*Cirsium vulgare*), bristly ox-tongue, vetch, wild oats, and non-native grasses. In addition to these species, the vegetation transect also revealed geranium (*Geranium* sp.), teasel (*Dipsacus sativus*), and curly dock. Adjacent to the project site is Himalayan blackberry which unsuccessful attempts were made to eradicate.

### 3. WEA Scores:

Wildlife = 1.5

Vegetation = 2.9

- Herbaceous (< 1 Meter) [2.7]
- Shrub (1-3 Meters) [3]
- Trees (> 3 Meters) [3]

Buffer = 1.5

Hydrology = 3

Surrounding Land Use = 2.1

**TOTAL: 11**

**III. PERMIT COMPLIANCE:**

Criteria:

1. Create 0.05 acres and restore [or Preserve?] 0.01 acres of seasonal wetland (Note that U.S. ACOE staff will investigate whether these numbers were changed during the field visit by the consultant for the project, or whether they were accurate in the office notes taken from the reports. It is assumed here that the numbers were changed in the field to 0.05 created and 0.01 [or 0.1? Preserve?] If these numbers are wrong, adjust Section IV below.)
2. 75 % cover by herbaceous wetland (FAC-OBL) plants
3. 2:1 ratio of perennial to annual species (Note: cattails, blackberry, and prickly ox-tongue not counted for ratio or cover.)
4. Willows doubled in all dimensions
5. Soil saturation into the growing season in restored areas; "more permanent" in created areas.

**Status:**

All criteria met. Corps signed off in August 2000.

**IV. WETLAND GAIN OR LOSS:**

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 0.07 and Created Acres = 0.05**. The site actually created a little bit more than required (0.07 acres), resulting in a quantitative net gain/loss of zero acres.

**V. RECOMMENDATIONS:**

1. Eradicate Himalayan blackberry in the adjacent area.

WEA FORM

Site #: 17

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project <input checked="" type="checkbox"/>	Existing Condition <input checked="" type="checkbox"/>	Proposed Condition <input type="checkbox"/>

Project Name:	Corps Ap. #:	RWQCB WDID #:
Berlex Biosciences	20000 E 76	2 0307063

Assessment Date:	Evaluators:	Wetland Type(s):
4/10/03	Breaux, Martindale, Evans, Cochrane	Perennial wetland

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
9 am to 11:15 am	12/94, so 8 years old in 2003

Wetland Acreage (100 acre recommended maximum):

GPS Coordinates:

0.01 restored & 0.05 created	Lat/Long: 37 59.00' 122 20.29'
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**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Grassland/open space	60% * 2.5	1.5
Industrial	20% * 1.5	0.3
Low volume highway	7.5% * 2	0.15
Medium volume highway	7.5% * 1.5	0.11
Residential (single & multi)	5% * 1.25	0.06
<b>SLU Total</b>		<b>2.12</b>

**FINAL SCORES:**

	<b>This Site's Score for Existing Condition on Day of Assessment:</b>	<b>Highest Possible Score for Existing Condition:</b>
1. Wildlife Utilization	1.5	3
2. Dominant Vegetation Cover*	2.9	3
(< 1 meter)	[2.75]	[3]
(1-3 meters)	[3]	[3]
(> 3 meters)	[3]	[3]
3. Buffer/Upland	1.5	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	2.1	3
<b>TOTAL FINAL SCORE</b>	<b>11</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see wildlife appendices.)  
 Very small site, fragmented, and quite isolated which diminishes its wildlife habitat value. However the willows do provide habitat for migratory birds. Willow thickets are very important to insect-eating birds and probably to bats as well.  
 Some birds observed included: red-winged blackbirds, song sparrows, Allen's hummingbird, American robin, CA towhee, American crow, Anna's hummingbird, American goldfinch, mocking bird, scrub jay, mourning dove, bustit.  
 Reptile: western terrestrial garter snake  
 Mammals: apparent gopher diggings, shrew or vole holes. (Black tailed deer known nearby)  
 Some invertebrates: swallow tail butterfly, diptera, aphid, amphipod, tick, black grass bug, leaf-hopper, spittle bug, mayfly larvae, beetle larvae, mosquito larvae and mosquito.

2. Wetland Dominant Vegetation Cover  
 Up to 25% invasive non-natives in the herbaceous layer including vetch, thistles, annual grasses, Himalayan blackberry. Native cattails may become too dense. Otherwise herbaceous layer is structurally complex and developing well.  
 Shrub and tree layers have no invasives but good structure, diversity, and vigor.

3. Habitat Support/Buffer

There is only a small buffer at this site so it was given a low score.

#### 4. Hydrology

This site was intended to be seasonal but appears to have hit an underground water source and is perennial. This calcareous seep is expected to remain a permanent source in the future.

#### 5. Surrounding Land Use (SLU)

This site gets a moderate score for surrounding land use primarily because there is a relatively large (compared to the size of the site) amount of surrounding open space.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 18

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Bay Point Corner Lot
2. **Project Location:** Located at General Chemical site in Contra Costa County west of the city of Pittsburg and directly east of the U.S. Navy's Concord Naval Weapons Station.  
**Lat/Long:** 38°02'52" / 121°59'10"  
**Field GPS:** [NA]
3. **U.S. ACOE File Number:** 19237E59
4. **SFB RWQCB File No:** WDID 2 0307065
5. **Wetland Type:** Tidal & Seasonal
6. **Project Size and Type:** 1.4 acre.
7. **Project Goals:** Simply states 1.0 acre of tidal and 0.4 acre of seasonal wetlands.
8. **Project Description:** Note that only limited information was available from the file at the time of this assessment. The project was mitigation for removal of contaminated sediment. Fill was imported and marsh elevations were established to provide approximately 2/3 of the area as tidal and 1/3 as seasonal wetlands (irregularly saturated). Site completed in 1994. Valley oaks and coyote bush died (too windy and salty). Other vegetation was largely successful.
9. **Years of Required Monitoring:** 5 Years
10. **Years of Monitoring Completed:** 4 Years (Annual monitoring scheduled for 5 years ([1994-1999] but project declared successful after 3 years, so no further monitoring required after Year 4 which was 1998).
11. **Project Permittee:** General Chemical (formerly Allied Signal)
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale. Met Lynn Hosley from CH2M Hill at the site.
13. **Wetland Assessment Date:** April 10, 2003 (12:45 to 2:00 p.m.)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

The perimeter of this small site was walked and several transects were conducted through the site. 100% of the site was visible from the assessment point.

### 2. Site Evaluation Description:

This site had a predominance of native tidal marsh vegetation in the restored tidal marsh area, a predominance of native grasses in the slightly higher wetland (= seasonal wetland), and some non-native species in the surrounding transitional/upland buffer area. From the assessment point the following rough approximations were made: 70% of the entire project area had tidal marsh vegetation with a predominance of pickleweed (57% of total site), and a very small amount of open water (<1%) which would be greater with higher tides and bare ground (<2%). The remaining 10% had dodder, alkali-heath (*Frankenia salina*), salt grass (*Distichlis spicata*), saltbush (*Atriplex* sp.), fleshy jaumea (*Jaumea carnosa*), brass buttons, and coyote bush. The seasonal wetlands covered about 30% of the total area with a predominance of meadow barley, California fescue (*Festuca californica*), purple needlegrass and native *Vulpia* sp. (The last species should be verified from the planting plan.) Non-natives included less than 1% rabbits foot grass. Broadleaf peppergrass and perennial ryegrass were in the surrounding upland buffer and common reed (*Phragmites communis*) was seen off in the distance on the mudflats.

The presence of common reed (it is not known whether this is the native or non-native species) on tidal marsh mudflats is reportedly fairly common in that section of the San Francisco Bay (Jules Evans, pers. comm.). Common reed is not likely to become a major threat since the clumps that appear after storms do not usually remain long (Peter Baye, pers. comm.).

No tidal channels were incorporated into the design which could provide important habitat for endangered CCR. The small site was reportedly a pickleweed plain originally and thus channels were not included. The site does provide a young pickleweed marsh with pannes as well as an upland edge with successfully planted native grasses. The site is developing as planned though the vegetation is not yet mature. Future problems might include succession to cattail or scirpus marsh and predation by red foxes.

### 3. WEA Scores:

Wildlife = 1

Vegetation = 2.75

- Herbaceous (< 1 Meter) [2.75]
- Shrub (1-3 Meters) [NA]
- Trees (> 3 Meters) [NA]

Buffer = 2

Hydrology = 3

Surrounding Land Use = 1

**TOTAL: 9.75**

### III. PERMIT COMPLIANCE:

Criteria:

1. Restore 1.0 acres of tidal marsh and 0.4 acres of seasonal wetland
2. Tidal Marsh: 75% cover of reference marsh [was 100% cover after Year 3]
3. Seasonal Marsh: 85% cover of reference [96% cover after Year 3]

Status:

- A jurisdictional wetland delineation was verified after Year 3 (1998).
- Target species were present at site visit (e.g., pickleweed, gum plant, fat hen, alkali heath, and meadow barley). Significant cover of non-native perennial rye grass (was considered a "naturalized" wetland species, so this was acceptable).
- This site is in compliance.

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 1.4 and Restored Acres = 1.4**. The actual wetland restoration is reportedly 1.7 acres, 0.3 acres over the target. This site represents a successful but still relatively young restoration but virtually no temporal losses were factored in for the contamination, construction, and maturation of the tidal/seasonal site.

### V. RECOMMENDATIONS:

1. Control broadleaf pepperweed around perimeter of restoration site. Note that original 1994 efforts to control broadleaf pepperweed were successful since, according to the project consultant, there is much less broadleaf pepperweed in 2003 than there was in 1994.
2. Remove small amounts of non-native canary grass (*Phalarus canariensis*) and artichoke thistle (*Cynara cardunculus*).
3. Re-evaluate site in 5 years to determine if planted native grasses and tidal marsh species are still successful.
4. Further investigate the presence of common reed in the Contra Costa/Suisun area marshes and its likelihood of becoming dominant in tidal marshes that are currently pickleweed marshes.

WEA FORM  
Site #: 18

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	Existing Condition	Proposed Condition
XX	XX	

Project Name:	Corps Ap. #:	RWQCB WDID #:
Bay Point Corner Lot for General Chemical (formerly Allied Signal)	19237 E 59	2 0307065

Assessment Date:	Evaluators:	Wetland Type(s):
4/10/03	Breaux, Martindale, Evans, Cochrane	Tidal & Seasonal

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
12:45 -- 2:00 pm	1994-2003 is 9 years

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
1.4 Acres	38 02'52" / 121 59'10" (estimated)

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Natural undeveloped area	50% * 3	1.5
Industrial	50% * 1	0.5
SLU Total		1

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	1	3
2. Dominant Vegetation Cover*	2.75	3
(< 1 meter)	[2.75]	[3]
(1-3 meters)	[NA]	[3]
(> 3 meters)	[NA]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	1	3
<b>TOTAL FINAL SCORE</b>	<b>9.75</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see wildlife appendices.)
---

This is a healthy marsh but it is still young and does not yet provide a lot of wildlife habitat. Still immature. The site is between Concord Naval Weapons Station and General Chemical, so highly industrialized area.

Assume salt marsh harvest mice are here because they are at CNWS.

Could also have black rails but cover is not well-developed yet.

Birds observed include: raven, western meadow lark, song sparrow (a listed species), killdeer, red-winged blackbird, tree swallow, barn swallow, mallards, rock doves, European starling.

Mammals: raccoon and dog tracks; voles' (?) runways;

Invertebrates: amphipods, crickets, moths, ladybird beetle larva, diptera, spider

## 2. Wetland Dominant Vegetation

### Cover

Tidal marsh and native grass species were planted and most are surviving including meadow barley.

Planted oaks died due to winds.

Nice herbaceous layer with pickleweed, alkali-heath, and native grasses.

## 3. Habitat Support/Buffer

Medium score because average buffer was between 30 and 300 feet without a lot of non-native species. There was, however, peppergrass which was reportedly lower than when the project was initiated due to initial control efforts (which were discontinued because Concord Naval Weapons Station was not controlling it).

## 4. Hydrology

Tidal source should remain viable in the future for both tidal and seasonal wetlands.

## 5. Surrounding Land Use (SLU)

Good natural buffer (wetland and San Francisco Bay) but also high industrial use.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 19

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Calabazas & San Tomas Aquinos Creeks, SCVWD
2. **Project Location:** Calabazas Creek between Guadalupe Slough and Miller Avenue in the cities of Santa Clara, Sunnyvale, and Cupertino in Santa Clara County.  
**Lat/Long:**  
**Field GPS:** 10S 0589715/ 4141636
3. **U.S. ACOE File Number:** [Need to attain from U.S. ACOE staff.]
4. **SFB RWQCB File No:** WDID 2 0343058
5. **Wetland Type:** Created brackish marsh
6. **Project Size and Type:** 1.7 Acres
7. **Project Goals:** Create a new marsh plain area with brackish marsh vegetation along Reach 9 of Calabazas Creek.
8. **Project Description:** This project is mitigation for impacts resulting from flood control measures along about 7 miles of Calabazas Creek. The mitigation marsh was created by compressing an existing levee, steepening the slopes, and excavating a ditch a few feet lower than the adjacent marsh. The mitigation marsh is about 15-20 feet wide and runs along the levee road and the Calabazas Creek across from the H.T. Harvey Highway 237 restoration/mitigation site.
9. **Years of Required Monitoring:** 5 Years.
10. **Years of Monitoring Completed:** 5 Years. (Construction completed in 12/1995; planting completed in 1997).
11. **Project Permittee:** Santa Clara Valley Water District
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Wines, & Costa
13. **Wetland Assessment Date:** May 5, 2003 (9:30 – 11:30 a.m.)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

The perimeter of about 50% of the project site was walked and the remaining 50% of the site perimeter was similar according to one member of the team who had previously walked 100% of the site. One vegetation transect was run through the project area. An assessment site was chosen where 30% of the vegetation could be seen which we estimated was representative of at least 50% of the mitigation project site.

### 2. Site Evaluation Description:

From the point of assessment the following rough approximations were made: 40% tule, 35% cattail, 20% mixed vegetation including natives such as willow and coyote bush (which may have been on site before the creation project), sedge (*Carex* sp.), mugwort (*Artemis* sp.), aster, and non-natives such as broadleaf peppergrass, giant reed (if not on site, very near the site), fennel, mustard, radish, and some grasses such as one of the annual fescues (*Vulpia myuros*?) and ripgut grass. An additional 5% of the site was covered by dead plant material which may have been wrack (washed up and carried from elsewhere) or plants that died in place. These were apparently mostly tules and cattails.

Except for the proximity of the aggressive non-natives bordering (or actually within the site boundary), this site is progressing well and is well-situated next to a developing marsh site.

### 3. WEA Scores:

Wildlife = 2

Vegetation = 2.6

- Herbaceous (< 1 Meter) [2.3; if peppergrass out of boundary]
- Shrub (1-3 Meters) [3]

- Trees (> 3 Meters) [NA]

Buffer = 2

Hydrology = 3

Surrounding Land Use = 2

**TOTAL: 11.6**

### III. PERMIT COMPLIANCE:

Criteria (5 years):

1. Create 1.7 acres of brackish marsh.
2. Successful re-establishment of breeding territories for Salt Marsh Yellowthroat and Marsh Wren.
3. Climax elevation of mitigation marsh matches that of existing marsh.
4. 80% absolute cover by native species.
5. <1% cover by Broadleaf peppergrass

Status:

- All ? monitoring reports submitted.
- All criteria met.
- Corps signed off in 200??

### IV. WETLAND GAIN OR LOSS:

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = 1.9 Acres** [1.7 of tidal brackish and 0.2 of fully tidal) **and Created Acres = 1.7 Acres**. This site appears to have represented a net loss in terms of area, especially since no allowance was made for temporal losses due to construction, planting, and the growth and maturation of the vegetation.

### V. RECOMMENDATIONS:

1. Determine whether the existing broadleaf peppergrass surrounding the site is within the mitigation project boundary or not. Whether it is or is not, the permit applicant should have the species eradicated to prevent further invasion of the area. Also recommended for removal on or near the site is giant reed, fennel, poison hemlock, mustard, and radish.
2. Investigate lowering or removing levee road.

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	Existing Condition	Proposed Condition
XX	XX	

Project Name:	Corps Ap. #:	RWQCB WDID #:
Calabazas & San Tomas Aquinas Creeks, SCVWD	???	2 0343058

Assessment Date:	Evaluators:	Wetland Type(s):
5/5/03	Breaux, Martindale, Evans, Cochrane, B. Wines & H. Costa	Brackish marsh

Assessment Time:	Project Age (since breach, fill, completed construction, etc.):
9:30 - 11:30 a.m.	8 Years (1995 to 2003)

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
1.7 Acres	10S 0589715/ 4141636

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Marsh restoration site	50% * 2.5	1.25
Old landfill	20% * 1	0.2
Wall to protect park	15% * 1.5	0.22
Salt pond	15% * 2.5	0.38
	SLU Total	2.05

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover* (< 1 meter)	2.6	3
(1-3 meters)	[2.3] [note that broadleaf peppergrass is a problem]	[3]
(> 3 meters)	[3]	[3]
3. Buffer/Upland	2	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	2	3
<b>TOTAL FINAL SCORE</b>	<b>11.6</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant Vegetation Cover.

## FIELD & FOLLOW UP NOTES:

### 1. Wildlife Use (For complete lists see wildlife appendices.)

Site ranked medium for wildlife. Supports yellow throats (special status species).

Generally good for birds and flying insects. Very good adjacent habitat which is a mitigation site, not yet mature but progressing well (the H.T. Harvey Highway 237 site.)

Birds observed: song sparrow (listed), marsh wren, common yellow throat, Wilson's warbler, Brewer's blackbird, cliff swallow, common bushtit, ring-necked pheasant, brown-headed cowbird, mourning dove, raven, American finch, snowy thrift.

[Adjacent site: avocet, black-necked stilt, gadwall, ruddy duck, American coot, western sandpiper, Forester's tern, mallard, pie-billed grebe, egret.]

Mammals observed: [no soft substrate to see tracks]

Invertebrates observed: spider, earwig, ant, slug, cabbage white butterfly

### 2. Wetland Dominant Vegetation

#### Cover

This site ranked well for herbaceous and shrub vegetation with a predominance of cattails, scirpus, sedge willow, mugwort and coyote bush.

Note that it is unclear whether the broadleaf peppergrass is actually part of the mitigation site or not but it should be removed to prevent invasion of the site. There is also giant reed nearby which could pose a threat to the site if not removed, in addition to fennel, radish, mustard, poison hemlock, and bristly ox-tongue.

### 3. Habitat Support/Buffer

Medium rank because the buffer is between 30 and 300 feet and has less than 49% exotic plant species (note, however, that the existing problem species mentioned under vegetation above could become dominant if not eradicated).

### 4. Hydrology

Site ranked high for hydrology because the hydrologic source is expected to remain reliable and it is serving its intended purpose as a flood channel. Note, however, that there are some signs of cutaway and lots of wrack deposits. Major erosion seems to be a bigger problem on the adjacent H.T. Harvey mitigation site on the other side of the road due to flooding from Calabazas & San Tomas Aquinas Creeks.

Consider not repairing the levee road or removing the levee if that could be done while retaining purpose of flood channel (?)

### 5. Surrounding Land Use (SLU)

The buffer has high ranking land uses (i.e., restoration site and salt pond which could have high bird use or high potential for restoration) and low ranking land uses (i.e., land fill and wall).

There is also an old road between the restoration site and this mitigation site which was considered part of the restoration site.

# Wetland Assessments in the San Francisco Bay Region (Spring 2003)

Assessment Site # 20 [Note that this site was substituted at the last minute for a different project so some of the details on this final project are still sketchy. They will be completed by U.S. ACOE staff.]

## I GENERAL PROJECT INFORMATION

1. **Project Name:** Lower Coyote Creek (Reach 2, Monitoring Site 6-1) - SCVWD
2. **Project Location:** San Jose [or Milpetas?]  
**Lat/Long:**  
**Field GPS:** 10S 0594639/ 4143488
3. **U.S. ACOE File Number:** (waiting for U.S. ACOE staff)
4. **SFB RWQCB File No:** WDID 2 0343058
5. **Wetland Type:** Riparian
6. **Project Size and Type:** 7 Acres of Creek plantings on Coyote Creek.
7. **Project Goals:** (U.S. ACOE staff is still collecting this information.)
8. **Project Description:** Riparian restoration excavated a low-flow channel and planted native riparian vegetation. Construction and planting were completed in early 1980's. (Monitoring reports are still being checked for impacts and project details.)
9. **Years of Required Monitoring:** Every fifth year indefinitely. (Benchmark monitoring at years 5, 10, 15, and every ten years thereafter for life of site).
10. **Years of Monitoring Completed:** 3 monitoring events at Years 5, 10, and 15.
11. **Project Permittee:** Santa Clara Valley Water District
12. **Wetland Assessors:** Breaux, Cochrane, Evans, Martindale, Wines, & Costa
13. **Wetland Assessment Date:** May 5, 2003 (1:15 – 2:30 p.m.)

## II. ECOLOGICAL WETLAND FUNCTION:

### 1. Field Methods:

The following were walked to assess vegetation: the levee road above the site, one transect from the levee road to the creek channel, and another transect to return from the creek to the levee. An assessment point was then selected on the levee road looking down at the site where approximately 15% of the project site could be seen.

### 2. Site Evaluation Description:

From the assessment point the following rough approximations were made: 0% open water (channel was not visible but did have water), 50% coyote bush, 20% willows, 20% elderberry (*Sambucus* sp.), 3% mugwort, 3% boxelder, and 3% poison hemlock. In addition, the levee and some of the surround area had non-native grasses and herbaceous plants including perennial ryegrass, ripgut grass, wild oats, foxtail (*Alopecurus* sp.), some thistles (*Cirsium?*), and poison hemlock.

The site appears to be developing well although it is still young for a riparian site. The coyote bush is mature but the trees are still mostly less than 20 feet high. An additional 15 years is estimated for full growth.

### 3. WEA Scores:

Wildlife = 2

Vegetation = 2.8

- Herbaceous (< 1 Meter) [2.3]
- Shrub (1-3 Meters) [3]
- Trees (> 3 Meters) [3]

Buffer = 3

Hydrology = 3

Surrounding Land Use = 2.2

**TOTAL: 13**

**III. PERMIT COMPLIANCE:**

Criteria:

1. Plant 7 acres of riparian vegetation.
2. 80% canopy cover at Year 10 of mid-to-upper story canopy.

Status:

- Project in compliance with both cover and reporting criteria.
- No sign-off because monitoring is for life of project.

**IV. WETLAND GAIN OR LOSS: (U.S. ACOE staff will provide the following numbers:)**

Overall Wetland Ratio of Lost Acres to Gained Acres: **Impacted Acres = ?** and **Restored Acres = 7**. [We need to know the impacted acres before we can answer this question of overall loss or gain for this project.]

**V. RECOMMENDATIONS:**

1. Remove poison hemlock.
2. Consider increasing willows.

<b>Wetland Ecological Assessments for SF Bay Wetland Restoration Projects (Spring 2003)</b>		
<b>Check one or two:</b>		
Mitigation Project	Existing Condition	Proposed Condition
XX	XX	

Project Name:	Corps Ap. #:	RWQCB WDID #:
Lower Coyote Creek (Reach 2, Monitoring Site 6-1)	???	2 0343058

Assessment Date:	Evaluators:	Wetland Type(s):
5/5/03	Breaux, Martindale, Evans, Cochrane Wines, & Costa	Riparian
Assessment Time:	Project Age (since breach, fill, completed construction, etc.):	
1:15 -- 2:30 p.m.	18-20 Years ?	

Wetland Acreage (100 acre recommended maximum):	GPS Coordinates:
7 Acres	0594639/ 4143488

**Surrounding Land Use Category (SLU)**

Land Use Category	Score x (% of area) =	Subtotals
Vegetated Open Space	50% * 2.5	1.25
Old sewage treatment ponds	50% * 2	1
	SLU Total	2.25

**FINAL SCORES:**

	This Site's Score for Existing Condition on Day of Assessment:	Highest Possible Score for Existing Condition:
1. Wildlife Utilization	2	3
2. Dominant Vegetation Cover* (< 1 meter)	2.8	3
(1-3 meters)	[3]	[3]
(> 3 meters)	[3]	[3]
3. Buffer/Upland	3	3
4. Wetland Hydrology	3	3
5. Surrounding Land Use	2.2	3
<b>TOTAL FINAL SCORE</b>	<b>13</b>	<b>15</b>

\*Add all 3 strata and divide by the number of strata used for Dominant  
Vegetation Cover.

**FIELD & FOLLOW UP NOTES:**

1. Wildlife Use (For complete lists see wildlife appendices.)

Rated medium because 3 listed species and a well-developed habitat.

Birds observed: common yellowthroat, song sparrow, white-tailed kite (all 3 listed); red-tailed hawk, turkey vulture, barn swallow, American goldfinch, house finch, mocking bird, lazuli bunting, orange-crowned warbler, Anna's hummingbird, scrub jay, nuttall's woodpecker, tree swallow, common bushtit, Vaux's swift

Mammals: jack rabbit; (gray) fox skat?

Invertebrates: cantharid beetle, lepidoptera & hemiptera larvae, midge, beetle, aphid, spider, cabbage white, hornet

2. Wetland Dominant Vegetation

Cover

Vegetation is rated high for all 3 layers. Dominant species include willows, box elder, coyote bush, elderberry, and mugwort. The herbaceous layer does have some aggressive non-natives, notably poison hemlock and thistles. also surrounds much of the site so it could invade if not controlled.

These species also surround much of the project site so should be controlled to avoid further invasion.

3. Habitat Support/Buffer

Buffer rated high because it averages greater than 300 feet and provides wildlife habitat.

To rate high, however, buffers should have less than 10% invasive species and the poison hemlock is prevalent around the project site. So, this rating might need to be lowered once the entire perimeter of the site can determine the extent of aggressive invasives.

The buffer is contiguous with offsite wetland system that provides large areas of wildlife habitat.

4. Hydrology

High rank because the hydrologic regime is expected to continue to maintain a viable riparian system.

5. Surrounding Land Use (SLU)

The old sewage treatment ponds were given a medium score because they appear to be used by shorebirds. Vegetated open space was given a high score.

## **APPENDIX III**

APPENDIX III. Birds Observed or Expected at or Near Wetland Sites (J. Evans)																					
(Bold-faced species indicate special status*)																					
Date	3/18	3/18	3/19	3/19	3/20	3.20	3/20	3/27	3/27	3/28	3/28	3/30	4/07	4/07	4/07	4/09	4/10	4/10	5/05	5/05	Special
WAE site #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	status codes*
<b>WATERBIRDS</b>																					
Pied-billed Grebe <i>Podilymbus podiceps</i>	√																		(√)		
Eared grebe																			(e)		
Western Grebe <i>Aechmophorus occidentalis</i>	√																				
<b>American White Pelican <i>Pelecanus erythrorhynchos</i></b>	√												(√)							(e)	CSC
<b>Double-crested Cormorant <i>Phalacrocorax auritus</i></b>							e											(e)	√		CSC
American Bittern <i>Botaurus lentiginosus</i>																			(e)	√	
Great Blue Heron <i>Ardea herodias</i>	√		√					e	e				e			√		e	e		
Great Egret <i>Ardea alba</i>	√						√	e	e				e					e	(√)		
Snowy Egret <i>Egretta thula</i>	√							√	e				e					e	√		
Green Heron <i>Butorides virescens</i>																			e		e
Black-crowned Night-Heron <i>Nycticorax nycticorax</i>	√						e	e											e	e	
Canada Goose <i>Branta canadensis</i>	√								e										(e)	e	
Gadwall <i>Anas strepera</i>	√						e	e											e	(√)	√
American Wigeon <i>Anas americana</i>	√						√	e					e							(e)	
Mallard <i>Anas platyrhynchos</i>	√			√			√	√	√	√			e			√		√	(√)	e	
Cinnamon Teal <i>Anas cyanoptera</i>							√						e						(e)		
Northern Shoveler <i>Anas clypeata</i>	√						e												(e)		
Northern Pintail <i>Anas acuta</i>	√						e												(e)		
Green-winged Teal <i>Anas crecca</i>	√						√	e													
Canvasback <i>Aythya valisineria</i>	√						e														
Greater Scaup <i>Aythya marila</i>	√						e														
Lesser Scaup <i>Aythya affinis</i>	√						e														
Bufflehead <i>Bucephala albeola</i>	√						e												(e)		
Common Goldeneye <i>Bucephala clangula</i>											√										
Ruddy Duck <i>Oxyura jamaicensis</i>	√						e												(√)		
<b>RAPTORS</b>																					
Turkey Vulture <i>Cathartes aura</i>	√		√	e	e		e	e	e	e	√	√	e	√		√		e	e	e	
<b>Osprey</b>					√													(√)			CSC
<b>White-tailed Kite <i>Elanus leucurus</i></b>	(√)		(√)		e	e	e	(√)	√				e						e	√	MNBMC
<b>Northern Harrier <i>Circus cyaneus</i></b>	(√)				e		√	√	e									e	√	√	CSC
<b>Sharp-shinned Hawk <i>Accipiter striatus</i></b>			e	e						e								√		e	CSC
<b>Cooper's Hawk <i>Accipiter cooperii</i></b>			√	e						e								e		e	CSC
Red-shouldered Hawk <i>Buteo lineatus</i>			√	e						√								e		e	
Red-tailed Hawk <i>Buteo jamaicensis</i>	(√)		√		√		√	e	e	e	√	√	(√)			√		e	(√)	e	
American Kestrel <i>Falco sparverius</i>	√		e		e	e	e	e	e	e	√	e	e	e				e	e	e	
<b>Peregrine Falcon <i>Falco peregrinus</i></b>	(√)						√											(e)			SE
<b>GALLINACEOUS BIRDS</b>																					
California Quail <i>Callipepla californica</i>			e?	e?						e	√									e	
<b>Yellow Rail <i>Coturnicops noveboracensis</i></b>	e																				CSC

Date	3/18	3/18	3/19	3/19	3/20	3/20	3/20	3/27	3/27	3/28	3/28	3/30	4/07	4/07	4/07	4/09	4/10	4/10	5/05	5/05	Special	
WAE site #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	status codes*	
<b>Black Rail <i>Laterallus jamaicensis</i></b>	(√)				(√)		(√)	(√)										e			ST,BCC	
<b>Clapper Rail <i>Rallus longirostris</i></b>	(√)				(√)		(√)											e?			FE,SE	
Virginia Rail <i>Rallus limicola</i>	e				e		e	e										e	e			
Sora <i>Porzana carolina</i>	e						e												e			
American Coot <i>Fulica americana</i>	√						e	e												(√)		
<b>SHOREBIRDS</b>																						
Black-bellied Plover <i>Pluvialis squatarola</i>	√						e															
<b>Snowy Plover <i>Charadrius alexandrinus</i></b>	(√)						e?														FT	
Semipalmated Plover <i>Charadrius semipalmatus</i>	√						e															
Killdeer <i>Charadrius vociferus</i>	√				√		e	√	√			e	√			√		√				
Black-necked Stilt <i>Himantopus mexicanus</i>	√						e						e							(√)		
American Avocet <i>Recurvirostra americana</i>	√						e						e							(√)		
Greater Yellowlegs <i>Tringa melanoleuca</i>	√						√	e					√									
Lesser Yellowlegs <i>Tringa flavipes</i>	(√)												e									
Willet <i>Catoptrophorus semipalmatus</i>	√						√	e										e				
Spotted Sandpiper <i>Actitis macularia</i>	(√)																					
<b>Whimbrel <i>Numenius phaeopus</i></b>	√						e														BCC	
<b>Long-billed Curlew <i>Numenius americanus</i></b>	√						√														BCC,CSC	
<b>Marbled Godwit <i>Limosa fedoa</i></b>	√						√															
Western Sandpiper <i>Calidris mauri</i>	√						√													(√)		
Least Sandpiper <i>Calidris minutilla</i>	√						√						e									
Dunlin <i>Calidris alpina</i>	√						e															
<b>Short-billed Dowitcher <i>Limnodromus griseus</i></b>	(√)						e		(√)												BCC	
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>	(√)						e															
Wilson's Snipe <i>Gallinago delicata</i>	e												√					e				
<b>GULLS &amp; TERNS</b>																						
Bonaparte's Gull <i>Larus philadelphia</i>	(√)						e															
Mew Gull <i>Larus canus</i>	(√)						e															
Ring-billed Gull <i>Larus delawarensis</i>	(√)						e															
<b>California Gull <i>Larus californicus</i></b>	√						e														BCC	
Western Gull <i>Larus occidentalis</i>	(√)						e															
Glaucous-winged Gull <i>Larus glaucescens</i>	(√)						e															
Caspian Tern <i>Sterna caspia</i>	√						e															
<b>Elegant Tern <i>Sterna elegans</i></b>	(√)						e														BCC,CSC	
Forster's Tern <i>Sterna forsteri</i>	√						e											(e)	(√)			
<b>Least Tern <i>Sterna antillarum</i></b>							e?														FE,SE	
<b>LANDBIRDS</b>																						
Rock Dove <i>Columba livia</i> - I	(√)	√				e					√	e		e		e		√				
Band-tailed Pigeon <i>Columba fasciata</i>			e?											e								
Mourning Dove <i>Zenaida macroura</i>	√	√	e			e	√	e		√	√	√				√	√	e	√	√		
Barn Owl <i>Tyto alba</i>							e			e						e		e		e		
Great Horned Owl <i>Bubo virginianus</i>	(√)		e	e			e		e										e	e		
<b>Burrowing Owl <i>Athene cunicularia</i></b>							e?														BCC,CSC	

Date	3/18	3/18	3/19	3/19	3/20	3.20	3/20	3/27	3/27	3/28	3/28	3/30	4/07	4/07	4/07	4/09	4/10	4/10	5/05	5/05	Special	
WAE site #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	status codes*	
<b>Short-eared Owl <i>Asio flammeus</i></b>	(√)						(√)											e?			CSC	
White-throated Swift <i>Aeronautus saxatalis</i>					(e)		e									e			(√)	e		
<b>Vaux's Swift <i>Chaetura vauxi</i></b>					(e)														(e)	√	CSC	
Anna's Hummingbird <i>Calypte anna</i>	√	√	√	e		√	√		e	√	√	e		e		√	√	e	e	√		
Allen's Hummingbird <i>Selasphorus sasin</i>		√														e	√			e		MNBMC
Belted Kingfisher <i>Ceryle alcyon</i>	√		e	e	e		e	√		e	√					e			e	e		
Acorn Woodpecker <i>Melanerpes formicivorus</i>			e	e																		
Nuttall's Woodpecker <i>Picoides nuttallii</i>			√	√						√				e						√		
Downy Woodpecker <i>Picoides pubescens</i>			e	e						√	e					e				e		
Hairy Woodpecker <i>Picoides villosus</i>																				e		
Northern Flicker <i>Colaptes auratus</i>		e	√	√						√	e					e				e		
Western Wood-Pewee <i>Contopus sordidulus</i>		e	e	e						e	e					e				e		
Pacific-slope Flycatcher <i>Empidonax difficilis</i>		e	e							e	e					e				e		
Black Phoebe <i>Sayornis nigricans</i>	√	e	√	√	e	e	e	e	e	√	e	e	e	√		√			e	e	e	
Say's Phoebe <i>Sayornis saya</i>	(√)				e		e	e					e						e			
Ash-throated Flycatcher <i>Myiarchus cinerascens</i>			e	e						e										e		
Western Kingbird <i>Tyrannus verticalis</i>	e										(√)											
<b>Loggerhead Shrike <i>Lanius ludovicianus</i></b>	(√)						e						√						e		BCC,CSC	
Cassin's Vireo <i>Vireo cassinii</i>																				e		
Hutton's Vireo <i>Vireo huttoni</i>			e	e						e												
Warbling Vireo <i>Vireo gilvus</i>		e	e	e?												e				e		
Western Scrub-Jay <i>Aphelocoma californica</i>		√	√	√		e				√	√	e		√		√	√			√		
American Crow <i>Corvus brachyrhynchos</i>	(√)	√	e	(√)						√	e	e	√	√		e	√	e				
Common Raven <i>Corvus corax</i>	(√)		(√)		(√)			√			e					√		√	(√)			
Horned Lark <i>Eremophila alpestris</i>	√																					
Tree Swallow <i>Tachycineta bicolor</i>	√	e	e	e	e	e	e		e	e	e	e	e	√		√		√	e	√		
Violet-green Swallow <i>Tachycineta thalassina</i>													e							e	e	
N. Rough-winged Swallow <i>Stelgidopteryx serripennis</i>	(√)				e						e		e			e		e	e	e		
Cliff Swallow <i>Petrochelidon pyrrhonota</i>	√						√		e	e	e	e	e			√		e	√	e		
Barn Swallow <i>Hirundo rustica</i>	√	e	e	e	e	e	√		√	√	e	e	e	√		√		√	e	√		
Chestnut-backed Chickadee <i>Poecile rufescens</i>			e	e										e								
Oak Titmouse <i>Baeolophus inornatus</i>			e	e						e				e								
Bushtit <i>Psaltriparus minimus</i>		e	√	√		√				√	√	√		√		√	√			√	√	
Bewick's Wren <i>Thryomanes bewickii</i>			e							e						√				e		
Marsh Wren <i>Cistothorus palustris</i>	(√)				(e)	√	e	e?	√											√		
Ruby-crowned Kinglet		√	e	√										e		e				e		
Western Bluebird <i>Sialia mexicana</i>			e	e			(√)			√	e		e			e		e				
Swainson's Thrush <i>Catharus ustulatus</i>											e?					e				e		
Hermit Thrush <i>Catharus guttatus</i>										√						e				e		
American Robin <i>Turdus migratorius</i>	(√)	√	e	e		e				√	e	e		e		e	√			e		
Wrentit <i>Chamaea fasciata</i>																						
Northern Mockingbird <i>Mimus polyglottos</i>	(√)	e	(√)		(e)		√			√		e	√					√		√		
American Pipit <i>Anthus rubescens</i>	√						e		e				e					e				

Date	3/18	3/18	3/19	3/19	3/20	3/20	3/20	3/27	3/27	3/28	3/28	3/30	4/07	4/07	4/07	4/09	4/10	4/10	5/05	5/05	Special	
WAE site #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	status codes*	
Cedar Waxwing <i>Bombycilla cedrorum</i>		e	e	e		e				√	e			e						e		
Orange-crowned Warbler <i>Vermivora celata</i>		e	e	e						√					e					√		
<b>Yellow Warbler <i>Dendroica petechia</i></b>			e							e	e				e					e	CSC	
Yellow-rumped Warbler <i>Dendroica coronata</i>	√		e	e		e				√	√		(√)	e		e				e		
Black-throated Gray Warbler <i>Dendroica nigrescens</i>			e										e							e		
<b>Common Yellowthroat <i>Geothlypis trichas</i></b>	√					e?	(√) e	e	e							√			√	√	BCC,CSC	
Wilson's Warbler <i>Wilsonia pusilla</i>		e	e	e						e	e		(√)		e				√	e		
Yellow-breasted Chat <i>Icteria virens</i>																				e	CSC	
Western Tanager <i>Piranga ludoviciana</i>																				e		
Spotted Towhee <i>Pipilo maculatus</i>			e											√		√				e		
California Towhee <i>Pipilo crissalis</i>		e	e	e								√		√	e	√				e		
Chipping Sparrow <i>Spizella passerina</i>			e	e																e		
Savannah Sparrow <i>Passerculus sandwichensis</i>	√				e		√	e	e				e			√		e	e			
<b>Grasshopper Sparrow <i>Ammodramus savannarum</i></b>																√						
Fox Sparrow <i>Passerella iliaca</i>			e	e										e	e	e				e		
<b>Song Sparrow <i>Melospiza melodia</i></b>	√	e	√	√	√		√	√	√					e		√	√	√	√	√	BCC,CSC	
Lincoln's Sparrow <i>Melospiza lincolni</i>																e				e		
White-crowned Sparrow <i>Zonotrichia leucophrys</i>	√	e	√	e		e	√	e	√	√		e	√	√	√			e	e	e		
Golden-crowned Sparrow	(√)	e	e	e		e	e	e	e	√		e	√	e		e		e	e	e		
Dark-eyed Junco <i>Junco hyemalis</i>		√	e	e		e										e				e		
Black-headed Grosbeak <i>Pheucticus melanocephalus</i>			e	e												e				e		
Lazuli Bunting <i>Passerina amoena</i>			e	e												e				√		
Red-winged Blackbird <i>Agelaius phoeniceus</i>	√					√	√	√	√	√	√	√	√	√	√	√	√	√	√	e		
<b>Tricolored Blackbird <i>Agelaius tricolor</i></b>																					BCC,CSC	
Western Meadowlark <i>Sturnella neglecta</i>	√							e	e					√	√					√		
Brewer's Blackbird <i>Euphagus cyanocephalus</i>	√	e	√			e				√	e	e	e	√		√				√	e	
Brown-headed Cowbird <i>Molothrus ater</i>	(√)		e							e	e					√				√		
Bullock's Oriole <i>Icterus bullockii</i>	(√)	e	e	e						e	e										e	
Purple Finch <i>Carpodacus purpureus</i>			e													e				e		
House Finch <i>Carpodacus mexicanus</i>	√	√	√		√	e	e	e	e	√	√	√	√			√	√	e	e	√		
Pine Siskin <i>Carduelis pinus</i>			e							e	e									e		
Lesser Goldfinch <i>Carduelis psaltria</i>		e	e	e		e				√	√	√	e	e		e				e	e	
American Goldfinch <i>Carduelis tristis</i>	√	√	√	√		e	e	e	e	e	e	√	√	√	√	√	√	e	√	√		
<b>INTRODUCED BIRDS</b>																						
European Starling <i>Sturnus vulgaris</i> - I	√	e	e	e		e	e	e	√	e	e					√		√		e		
House Sparrow <i>Passer domesticus</i> - I		e	e			e				√	e	e	√									
Ring-necked Pheasant - I																				√		
Wild Turkey - I			√	e						e												
<u>Legend</u>																						
√ = detected on field visit.																						
(√) = known to occur (from metadata)																						
e = expected, given habitat type and quality																						

Date	3/18	3/18	3/19	3/19	3/20	3.20	3/20	3/27	3/27	3/28	3/28	3/30	4/07	4/07	4/07	4/09	4/10	4/10	5/05	5/05	Special	
WAE site #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Special	
(e) = expected in adjacent habitat																						
e? = expected, but questionable																						
TOTALS																						
√	58	11	17	9	5	4	23	8	7	28	15	7	14	14	0	28	12	12	14	17		
(√)	31	0	3	1	3	0	5	1	2	0	1	0	4	0	0	0	1	0	7	0		
e	5	21	44	32	12	18	51	25	21	0	27	17	24	15	0	39	0	30	24	53		
(e)	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4	9	0		
e?	0	0	2	2	0	1	2	1	0	1	1	0	0	0	0	0	1	2	0	0		
* Special status codes:																						
FE = Federally Endangered																						
FT= Federally Threatened																						
SE= State Endangered																						
ST = State Threatened																						
BCC= Bird of Conservation Concern (USFWS)																						
CSC=California Special Concern species (CDFG)																						
MNBMC= Migratory Nongame Birds of Management Concern (USFWS).																						
References for Special Status Species																						
<a href="http://www.dfg.ca.gov/hcpb/species/species.shtml">http://www.dfg.ca.gov/hcpb/species/species.shtml</a>																						
<a href="http://migratorybirds.fws.gov/reports/bcc2002.pdf">http://migratorybirds.fws.gov/reports/bcc2002.pdf</a>																						

## **APPENDIX IV**

APPENDIX IV: Invertebrates Observed at Wetland Assessment Sites, Spring 2003 (S. Cochrane)					
<b>1. Sonoma Baylands</b>					
<b>3/18/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>48 m sweep</b>					
true bug larva	Hemiptera				1
fly	Diptera				1
thrip	Thysanoptera				1
click beetle	Coleoptera	Elateridae			1
spider					1
				Total	5
<b>Aquatic Sweeps</b>					
topsmelt, larval	Antheriniformes	Antherinidae	<i>Atherinops</i>	<i>affinis</i>	3
sculpin	Scorpaeniformes	Cottidae			1
<b>Observed outside of sweep</b>					
waterboatman	Hemiptera	Corixidae			12s
worm	Class Oligochaeta				2
robber fly	Diptera	Asilidae			1
lady-bird beetle	Coleoptera	Coccinellidae			
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
Baltic clam shells		Tellinidae	<i>Macoma</i>	<i>baltica</i>	
bumble bee	Hymenoptera	Apidae	<i>Bombus</i>		1
<b>2. Laurel Creek</b>					
<b>3/18/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>25 m sweep</b>					
spider					
louse fly	Diptera	Hippoboscidae			1
robber fly	Diptera	Asilidae			1
fly	Diptera				1
midge	Diptera	Chironomidae			2
leaf hopper	Hemiptera	Cicadellidae			2
true bug larva	Hemiptera				7
wasp	Hymenoptera				1
				Total	15
<b>Aquatic sweep</b>					
waterboatman	Hemiptera	Corixidae			3
scavenger water beetle	Coleoptera	Hydrophilidae			1
<b>Observed outside of sweep</b>					
hairstreak butterfly	Lepidoptera	Lycaenidae			1
crawdad	suborder Rapantia	Parastacidae			3
minnow					10
<b>3. Green Valley</b>					
<b>3/19/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>44 m sweep</b>					
fly	Diptera				6
true bug	Hemiptera				2
black grass bug	Hemiptera		<i>Irbisia</i>		18
aphid	Hemiptera	Aphididae			2
lady-bird beetle larva	Coleoptera	Coccinellidae	<i>Hippodamia</i>	<i>convergens</i>	8
				TOTAL	36
<b>Aquatic Sweeps</b>					
stone fly larvae	Plecoptera				3
midge	Diptera	Chironomidae			3
<b>Observed outside of sweep</b>					
water strider	Hemiptera	Gerridae	<i>Gerris</i>	<i>remigis</i>	
ant	Hymenoptera	Formicidae			1
wasp	Hymenoptera	Sphecidae			1
lady bird beetle	Coleoptera	Coccinellidae	<i>Hippodamia</i>	<i>convergens</i>	1

Invertebrates Observed at Wetland Assessment Sites, Spring 2003

alfalfa sulphur	Lepidoptera	Pieridae	<i>Colias</i>	<i>eurytheme</i>	1
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
<b>Vertebrates</b>					
western fence lizard	Squamata	Iguanidae	<i>Sceloperous</i>	<i>occidentalis</i>	3
Sacramento sucker		Catostomidae	<i>Catostomus</i>	<i>occidentalis</i>	18
<b>4. Paradise Valley</b>					
<b>3/19/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>21m sweep</b>					
leaf hopper	Hemiptera	Cicidellidae			3
larvae	Hemiptera				3
aphid	Hemiptera	Aphididae			2
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	5
midge	Diptera	Chironomidae			1
fly	Diptera				2
				Total	16
<b>Aquatic Sweep</b>					
damsel fly	Odonota				2
waterboatman	Hemiptera	Corixidae			3
aquatic snail					2
snail eggs					
<b>Observed outside of sweep</b>					
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
pardalis blue	Lepidoptera	Pieridae	<i>Icaricia</i>	<i>icarioides pardalis</i>	1
California Ringlet	Lepidoptera	Pieridae	<i>Coenonympha</i>	<i>california californica</i>	1
<b>5. Richmond Parkway</b>					
<b>3/20/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
fly	Diptera				1
crane fly	Diptera	Tipulidae			1
midge	Diptera				1
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	1
				Total	4
<b>Observed outside of sweep</b>					
scarlet spider mite					7
amphipods	Amphipoda	Gamaridae			100's
mouse-eared marsh snail	Basommatophora	Melampidae	<i>Myosotella</i>	<i>myosotis</i>	12
spider					1
<b>6. Shell Oil Refinery Marsh, Unit X</b>					
<b>4/10/03</b>					
black grass bug	Hemiptera		<i>Irbisia</i>		12s
<b>7. Robert's Landing</b>					
<b>3/27/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>26 m sweep</b>					
wasp	Hymenoptera				1
black grass bug	Hemiptera	Miridae	<i>Irbisia</i>		1
crane fly	Diptera	Tipulidae			1
<b>Aquatic sweep</b>					
amphipods	Amphipoda	Gamaridae			6
isopods	Isopoda	Sphaeromatidae	<i>Sphaeroma</i>		10
<b>Observed outside sweep</b>					
lady bird beetle larva	Coleoptera	Coccinellidae			1
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
pygmy blue butterfly	Lepidoptera	Lycaenidae	<i>Brephidium</i>	<i>exilis</i>	2
shore fly	Diptera	Ephydriidae			12s
spider					2
Baltic clam		Tellinidae	<i>Macoma</i>	<i>baltica</i>	1
<b>8. Triangle Marsh, Hayward</b>					
<b>3/27/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>14.7m sweep</b>					
				Total	39

Invertebrates Observed at Wetland Assessment Sites, Spring 2003

<b>Invertebrates</b>					
<b>sweep</b>					
midge	Diptera	Chironomidae			1
	Hemiptera				1
spider					1
snail					1
				Total	4
<b>Aquatic Sweeps</b>					
gem clam shell	Veneroidea	Veneridae	<i>Gemma</i>	<i>gemma</i>	1
Japanese littleneck clam shell	Veneroidea	Veneridae	<i>Tapes</i>	<i>japonica</i>	1
anemone	Actiniaria	Haliplanellidae	<i>Diadumene.</i>	<i>lineata</i>	2
<b>Observed outside of sweep</b>					
brine fly	Diptera	Ephydriidae	<i>Ephydra</i>	<i>riparia</i>	100's
lady-bird beetle larva	Coleoptera	Coccinellidae			1
spider					1
Eastern mud snail	Neogastropoda	Nassariidae	<i>Ilyanassa</i>	<i>obsoleta</i>	1000's
soft shell clam	Myoidea	Myidae	<i>Mya</i>	<i>arenaria</i>	~10
Olympic or native oyster	Ostreidae	Pterioidea	<i>Ostrea</i>	<i>lurida</i>	~10
anemone	Actiniaria	Haliplanellidae	<i>Diadumene.</i>	<i>lineata</i>	10's
bay mussel	Mytiloidea	Mytilidae	<i>Mytilus</i>	<i>edulis</i>	2
lined shore crab	Decapoda	Grapsidae	<i>Pachygraspus</i>	<i>crassipies</i>	2
<b>Vertebrates</b>					
black-tail jack rabbit	Lagomorpha	Leporidae	<i>Lepus</i>	<i>californicus</i>	1
<b>9. Mayhew's Landing [ Not assessed because impacts to wetlands were avoided]</b>					
<b>10. Dublin Meadows</b>	<b>3/28/2003</b>				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>13m transect</b>					
lady bird beetle	Coleoptera	Coccinellidae	<i>Hippodamia</i>	<i>convergens</i>	1
beetle	Coleoptera				1
black wasp (small)	Hymenoptera				6
larvae, green	Lepidoptera				6
black grass bug	Hemiptera	Miridae	<i>Irbisia</i>		10
black grass bug larvae	Hemiptera				1
green adult	Hemiptera	Miridae			1
green larvae	Hemiptera	Miridae			10
black larvae	Hemiptera				20
winged aphid	Hemiptera	Aphididae			2
aphid (wingless)	Hemiptera	Aphididae			1
midge	Diptera	Chironomidae			1
unidentified, ? May be midges	Diptera				5
ground spider	Arachnida				1
				Total	66
<b>Observed outside sweep</b>					
damselfly	Odonata				4
lady bird beetle	Coleoptera	Coccinellidae	<i>Hippodamia</i>	<i>convergens</i>	1
black aphids	Hemiptera	Aphididae			many
unidentified, ? May be midges	Diptera				1
red winged ant	Hymenoptera				1
bumble bee	Hymenoptera	Apidae			1
monarch	Lepidoptera	Nymphalidae	<i>Danaus plexippus</i>		2
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
<b>11. West Branch Alamo Creek</b>	<b>3/28/2003</b>				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>13m transect</b>					
lady bird beetle	Coleoptera	Coccinellidae			1
fly	Diptera				100+
bug	Homoptera				1
true bug larvae	Hemiptera				11
winged aphid	Hemiptera	Aphididae			22
buckeye	Lepidoptera	Nymphalidae	<i>Junonia</i>	<i>coenia</i>	1
<b>Aquatic Sweeps</b>					
snails 1 flat, 11 spiral shell					12
snail egg clusters					

Invertebrates Observed at Wetland Assessment Sites, Spring 2003

damselfly larva	Odonota				1
crawdad	suborder Rapantia	Parastacidae			1
<b>Observed outside sweep</b>					
wasp	Hymenoptera	Sphecidae			1
yellow jacket	Hymenoptera	Vespidae	<i>Vespula</i>		1
pale swallow-tail butterfly	Lepidoptera	Papilioninae	<i>Papilio</i>	<i>eurymedon</i>	1
spider					1
<b>12. Bettencourt Detention Basin [not assessed because no access and only part of a larger project.]</b>					
<b>13 (A) Fleeman (A) [Restored on site]</b>					
<b>4/7/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>26m transect</b>					
fly	Diptera				8
leaf hopper	Homoptera				1
aphid	Hemiptera	Aphididae			3
larvae	Hemiptera				8
cricket	Orthoptera	Gryllacrididae			1
thrip	Thysanoptera				1
spider				Total	22
<b>Aquatic Sweeps</b>					
predaceous water beetle	Coleoptera	Dytiscidae			1
waterboatman	Hemiptera	Corixidae			50+
mayfly larvae	Ephemeroptera				4
dragon fly larva	Odonata				1
midge	Diptera	Chironomidae			1
shorefly	Diptera	Ephydriidae			100s
clam "shrimp"	Conchostraca				12s
water "flea"	Cladocera	Daphniidae			1000s
water mite	Acarina				100s
copepod (red)	Cyclopoida				100s
<b>Vertebrates</b>					
pacific tree (chorus) frog	Anura	Hylidae	<i>Pseudacris</i>	<i>regilla</i>	1
<b>13 (B) Fleeman Offsite Mitigation</b>					
<b>4/7/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>35m transect</b>					
fly	Diptera				10
mosquito	Diptera	Culicidae			1
true bug larvae	Hemiptera				2
aphid	Hemiptera	Aphididae			3
cricket	Orthoptera	Gryllacrididae			1
larva	Lepidoptera				1
				Total	18
<b>Observed outside of sweep</b>					
alfalfa sulphur	Lepidoptera	Pieridae	<i>Colias</i>	<i>eurytheme</i>	1
California ringlet	Lepidoptera	Pieridae	<i>Coenonympha</i>	<i>california californica</i>	1
lady bird beetle	Coleoptera	Coccinellidae			1
leaf hopper	Hemiptera	Cicadellidae			1
stink bug	Hemiptera	Pentatomidae			1
mosquito	Diptera	Culicidae			1
fly	Diptera				1
hover fly	Diptera	Syrphidae			1
walking stick	Phasmatodea				1
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	1
click beetle	Coleoptera	Elateridae			1
flower beetle	Coleoptera				1
native bee	Hymenoptera				1
spider					1
<b>Vertebrates</b>					
pacific tree (chorus) frog	Anura	Hylidae	<i>Pseudacris</i>	<i>regilla</i>	3
<b>14. Red Top Road</b>					
<b>4/7/2003</b>					
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>21M sweep</b>					
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	1

Invertebrates Observed at Wetland Assessment Sites, Spring 2003

black grass bug	Hemiptera		<i>Irbisia</i>		6
leaf hopper	Hemiptera	Cicidellidae			5
true bug larvae	Hemiptera				3
crane fly	Diptera				1
wasp	Hymenoptera	Sphecidae			1
tick					4
spider					1
cricket	Orthoptera	Gryllacrididae			5
snakefly	Neuroptera		<i>Agulla</i>		4
				Total	31
<b>Observed outside of sweep</b>					
California Ringlet	Lepidoptera	Pieridae	<i>Coenonympha</i>	<i>california californica</i>	1
<b>15. Pittman Road [not assessed because project was not performed]</b>					
<b>16. Calera Creek (Pacifica)</b>					
	4/9/03				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>11m sweep</b>					
spittlebug larvae	Hemiptera	Aphrophoridae			1
aphid	Hemiptera	Aphididae			2
spider					1
				Total	4
<b>Observed outside of sweep</b>					
fly	Diptera				1
wasp	Hymenoptera	Sphecidae			1
leaf hopper	Hemiptera	Cicidellidae			1
aphid	Hemiptera	Aphididae			1
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	1
California ringlet	Lepidoptera	Pieridae	<i>Coenonympha</i>	<i>california californica</i>	1
buckeye	Lepidoptera	Nymphalidae	<i>Junonia</i>	<i>coenia</i>	1
damsel fly, bluet	Odonota	Coenagrionidae	<i>Enallagma</i>		2
spider					
in creek					
stonefly larvae	Plecoptera				5
black fly larvae	Diptera	Simuliidae	<i>Simulium</i>		25+
snails					10+
snail egg clusters					4
<b>Vertebrates</b>					
frog	Anura				3
<b>17. Berlex</b>					
	4/10/2003				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>16m transect</b>					
black grass bug	Hemiptera		<i>Irbisia</i>		7
true bug larva	Hemiptera				1
leaf hopper	Hemiptera	Cicidellidae			3
aphid	Hemiptera	Aphididae			6
spittlebug larvae	Hemiptera	Aphrophoridae			2
fly	Diptera				2
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	3
				Total	24
<b>Aquatic Sweeps</b>					
amphipods	Amphipoda				7
beetle, beetle larva	Coleoptera				2
mosquito	Diptera	Culicidae			50+
mayfly larvae	Ephemeroptera				25+
water "flea"	Cladocera	Daphniidae			100s
<b>18. Bay Point, General Chemical</b>					
	4/10/2003				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>31m transect</b>					
lady bird beetle	Coleoptera	Coccinellidae			11
true bug larva	Hemiptera				1
fly	Diptera				1
spider					2
					15
<b>Observed outside of sweep</b>					
amphipods	Amphipoda				100s
moths	Lepidoptera				12s

Invertebrates Observed at Wetland Assessment Sites, Spring 2003

lady bird beetle	Coleoptera	Coccinellidae			
cricket	Orthoptera	Gryllacrididae			chirping
<b>19. Calabazas Creek</b>	<b>5/5/2003</b>				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>17.7m transect</b>					
stink bug	Hemiptera	Pentatomidae			1
				Total	1
<b>Observed outside of sweep</b>					
European earwig	Dermaptera	Forficulidae	<i>Forficula</i>	<i>auricularia</i>	1
ant	Hymenoptera	Formicidae			100s
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
slug	Geophila				3
<b>20. Coyote Creek</b>	<b>5/5/03</b>				
<b>Common Name</b>	<b>Order</b>	<b>Family</b>	<b>Genus</b>	<b>Species/sub spp.</b>	<b>Number</b>
<b>Invertebrates</b>					
<b>13m sweep</b>					
brown leatherwing	Coleoptera	Cantharidae	<i>Cantharis</i>	<i>consors</i>	1
larva	Lepidoptera				1
midge	Diptera	Chironomidae			6
beetle	Coleoptera				1
true bug larva	Hemiptera				6
aphid	Hemiptera	Aphididae			1
true bug	Hemiptera				1
					1
					18
<b>Observed outside of sweep</b>					
cabbage white butterfly	Lepidoptera	Pieridae	<i>Pieris</i>	<i>rapae</i>	1
wasp	Hymenoptera	Sphecidae			1
spider					

## **APPENDIX V**

Appendix V. Mammals, Fish, Amphibians, and Reptiles Observed

APPENDIX V. Mammals, Fish, Amphibians, or Reptiles Animals or their Sign Observed at Wetland Sites (WEA Team)																				
Date	3/18	3/18	3/19	3/19	3/20	3.20	3/20	3/27	3/27	3/28	3/28	3/30	4/07	4/07	4/07	4/09	4/10	4/10	5/05	5/05
WAE site #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>MAMMALS</b>																				
Meadow mouse?	*																			
Vole, <i>Micotus</i> (or runways)	*												*					*		
Blacktailed Jackrabbit, <i>Lepus californicus</i>	*						*	*					*	*						*
Raccoon, <i>Procyon lotor</i>	*																			
Blacktailed deer, <i>Odocoileus hemionus</i>																		*		
Ground squirrels, <i>Spermophilus beecheyi</i> ?	*						*	*			*					*				
<b>Tracks, Scat, or Other Sign</b>																				
Rodent burrows or tracks	*		*										*					*		
Muskrat tracks, <i>Ondatra zebenthicus</i> ?						*							*							
Skunk tracks, <i>Mephitis mephitis</i>			*																	
Raccoon tracks			*								*								*	
Mountain lion, dog, or coyote tracks			*																	
Deer tracks				*																
Fox scat (gray fox?), <i>Urocyon cinereoargenteus</i>																				*
Coyote scat, <i>Canis latrans</i>	*																			
Pocket gopher diggings, <i>Thomomys</i>																*	*			
Dead rat, <i>Rattus</i> sp.					*															
Feral or domestic cat, <i>Felis catus</i>							*			*	*					*				
Feral or domestic dogs																*		*		
<b>FISH</b>																				
Sculpin, <i>Leptocottus</i> sp.?	*																			
Topsmelt, <i>Atherinops</i>	*																			
Sacramento Sucker, <i>Catostomus occidentalis</i>			*																	
Unknown										*										
<b>AMPHIBIANS</b>																				
Eggs (salamander?)			*																	
Frog (unknown species)				*												*				
Tree Frog, <i>Hyla regilla</i>													*							
<b>REPTILES</b>																				
Western fence lizard, <i>Sceloporus occidentalis</i>			*							*?	*			*						
Garter snake, <i>Thamnophis</i>						*										*	*			
Sites #9 & #15 were not assessed.																				
Site #19 had no visible soft substrate to see tracks																				

# **APPENDIX VI**

## Appendix VI. Most plants observed at the Wetland Assessment Sites

(B. Pavlik, S. Cochrane, D. Benner & rest of the WEA Team).

Common name	Latin name	Native to California? Y=yes and N=no
Alder	<i>Alnus sp.</i>	
Alkali-heath	<i>Frankenia salina</i>	y
Arroyo lupine	<i>Lupinus succulentus</i>	y
Arroyo willow	<i>Salix lasiolepis</i>	y
Artichoke thistle	<i>Cynara cardunculus</i>	n
Ash	<i>Fraxinus sp.</i>	
Australian saltbush	<i>Atriplex semibaccata</i>	y
Baltic rush	<i>Juncus balticus</i>	y
Barley	<i>Hordeum sp.</i>	
Bermuda buttercup	<i>Oxalis pes-caprae</i>	n
Big leaf maple	<i>Acer macrophyllum</i>	y
Black mustard	<i>Brassica nigra</i>	n
Black poplar	<i>Populus nigra</i>	n
Blackberry	<i>Rubus sp.</i>	
Blue elderberry	<i>Sambucus mexicana</i>	y
Box elder	<i>Acer negundo</i>	y
Brass buttons	<i>Cotula coronopifolia</i>	n
Bristly ox-tongue	<i>Picris echioides</i>	n
Broadleaf peppergrass	<i>Lepidium latifolium</i>	n
Broadleaved cattail	<i>Typha latifolia</i>	y
Buckeye	<i>Aesculus californica</i>	y
Bull thistle	<i>Cirsium vulgare</i>	n
Bulrush/tule	<i>Scirpus sp.</i>	
Bulrush/tule	<i>Scirpus californicus</i>	y
California bay laurel	<i>Umbellularia californica</i>	y
California bee plant	<i>Scrophularia californica</i>	y
California blackberry	<i>Rubus ursinus</i>	y
California brome	<i>Bromus carinatus</i>	y
California button-willow	<i>Cephalanthus occidentalis</i>	y
California cord grass	<i>Spartina foliosa</i>	y
California fescue	<i>Festuca californica</i>	y
California hedge nettle	<i>Stachys bullata</i>	y
California poppy	<i>Eschscholzia californica</i>	y
California rose	<i>Rosa californica</i>	y
Canary grass	<i>Phalaris canariensis</i>	n
Carolina geranium	<i>Geranium carolinanum</i>	y
Cattail	<i>Typha sp.</i>	
Cinquefoil	<i>Potenilla sp.</i>	y
Coast redwood	<i>Sequoia sempervirens</i>	y
Coffeeberry	<i>Rhamnus californica</i>	y
Common reed	<i>Phragmites communis</i>	y
Common sow thistle	<i>Soncus oleraceus</i>	n
Common threesquare	<i>Scirpus pungens</i>	y
Contra Costa goldfields	<i>Lasthenia conjugens</i>	y
Cottonwood	<i>Populus sp.</i>	
Coyote bush	<i>Baccharis pilularis</i>	y
Coyote thistle	<i>Eryngium vaseyi</i>	y
Creeping spikerush	<i>Eldocharis macrostachya</i>	y
Creeping wild rye	<i>Leymus triticoides</i>	y
Curly dock	<i>Rumex crispis</i>	n
Cutleaf geranium	<i>Geranium dissectum</i>	n
Deer grass	<i>Muhlenbergia rigens</i>	y

Common name	Latin name	Native to California? Y=yes and N=no
Delta woolly-marbles	<i>Psilocarphus brevissimus var. multiflorus</i>	y
Dodder	<i>Cuscuta sp.</i>	
Douglas meadowfoam	<i>Limnanthes douglasii</i>	y
Dove's foot geranium	<i>Geranium molle</i>	n
Dwarf rush	<i>Juncus uncialis</i>	y
Elderberry	<i>Sambus sp.</i>	
Fennel	<i>Foeniculum vulgare</i>	n
Field mustard	<i>Brassica rapa</i>	n
Flannelbush	<i>Fremontodendron californicum</i>	y
Fleshy jaumea	<i>Jaumea carnosa</i>	y
Foxtail	<i>Aleopecurus sp.</i>	
Foxtail chess	<i>Bromux madritensis ssp. rubens</i>	n
Fremont cottonwood	<i>Populus fremontii</i>	y
Fremont goldfields	<i>Lasthenia fremontii</i>	y
Geranium	<i>Geranium sp.</i>	
German ivy	<i>Senecio mikanioides</i>	n
Giant reed	<i>Arundo donax</i>	n
Green popcorn flower	<i>Plagiobothrys greenei</i>	y
Gumplant	<i>Grindelia sp</i>	y
Hairy/smooth pampas grass	<i>Cortaderia jubata/selloane</i>	n
Harding grass	<i>Phalaris stenoptera</i>	n
Himalayan blackberry	<i>Rubus discolor</i>	n
Horsetail	<i>Equisitum sp.</i>	
Hottentot-fig (iceplant)	<i>Carpobrotus edulis</i>	n
Italian rye grass	<i>Lolium multiflorum</i>	n
Johnnytuck	<i>Triphysaria eriantha</i>	y
Jointed charlock	<i>Raphanus rapharistrum</i>	n
Live oak	<i>Quercue agrifolia</i>	y
Maroonspot downingia	<i>Downingia concolor</i>	y
Meadow barley	<i>Hordeum brachyantherum (ssp. brachyanther</i>	y
Meadow foam	<i>Limnanthaceae sp.</i>	
Mediterranean barley	<i>Horeum marinum</i>	n
Medusahead	<i>Taeniantherum caput-medusae</i>	n
Milk thistle	<i>Silybum marinum</i>	n
Miniature lupine	<i>Lupinus bicolor</i>	y
Mugwort	<i>Artemesia sp.</i>	
Nasturium	<i>Tropaeolum majus</i>	n
Northern California black walnut	<i>Juglans californica var. hindsii</i>	y
Nutsedge	<i>Cyperus sp.</i>	
Pacific (native ) foxtail	<i>Alopecurus saccatus</i>	y
Pacific oenanthe	<i>Oenanthe sarmentosa</i>	y
Perennial rye grass	<i>Lolium perenne</i>	n
Periwinkle	<i>Vinca major</i>	n
Pickleweed	<i>Salicornia virginica</i>	y
Pillwort	<i>Pilularia americana</i>	y
Pine	<i>Pinus sp.</i>	
Poison hemlock	<i>Conium maculatum</i>	n
Poison oak	<i>Toxicodendron diversilobium</i>	y
Purple needle grass	<i>Nasella pulchra</i>	y
Purslane speedwell	<i>Veronica peregrina ssp. xalapensis</i>	y
Pygmyweed	<i>Crassula aquatica</i>	y
Quillwort	<i>Lilaea scilloides</i>	y
Rattail fescue	<i>Vulpia myuros</i>	n
Red alder	<i>Alnus rubra</i>	y
Red elderberry	<i>Sambucus racemosa</i>	y
Red stem filaree	<i>Erodium cicutarium</i>	n

Common name	Latin name	Native to California? Y=yes and N=no
Red willow	<i>Salix laevigata</i>	y
Redbud	<i>Cercis occidentalis</i>	y
Ripgut grass	<i>Bromus diandrus</i>	n
Robust bulrush	<i>Scirpus robustus</i>	y
Rush	<i>Juncus sp.</i>	
Sage	<i>Salvia sp.</i>	
Salt grass	<i>Distichlis spicata</i>	y
Saltbush	<i>Atriplex sp.</i>	
Saltmarsh dodder	<i>Cuscuta salina</i>	y
Salt-water cord grass	<i>Spartina alternifolia</i>	n
Scotch broom	<i>Cytisus scoparius</i>	n
Sea lavender	<i>Limonium californicum</i>	y
Sedge	<i>Carex sp.</i>	
Semaphore grass	<i>Pleuropogon californicus</i>	y
Sheep-sorrel	<i>Rumex acetosella</i>	n
Shining willow	<i>Salix lucida ssp. lasiandra</i>	y
Sitka willow	<i>Salix sitchensis</i>	y
Slender popcorn flower	<i>Plagiobothrys stipitatus</i>	y
Slender woolly-heads	<i>Psilocarphus tenellus</i>	y
Smooth goldfields	<i>Lasthenia glaberrima</i>	y
Soft cheat grass	<i>Bromus hordeaceus</i>	n
Sour clover	<i>Trifolium fucatum</i>	y
Spearscale	<i>Atriplex triangularis</i>	y
Stinging nettle	<i>Urtica dioica</i>	n
Tall flatsedge	<i>Cyperus eragrostis</i>	y
Teasel	<i>Dipsacus sativus</i>	n
Toad rush	<i>Juncus bufonius</i>	y
Toyon	<i>Heteromeles arbutifolia</i>	y
Tree-tobacco	<i>Nicotiana glauca</i>	n
Tricolor monkey flower	<i>Mimulus tricolor</i>	y
Valley oak	<i>Quercus lobata</i>	y
Vetch	<i>Vicia sativa</i>	n
Waterfern	<i>Azolla Filiculoides</i>	y
Wild oats	<i>Avena fatua</i>	n
Wild radish	<i>Raphanus sativus</i>	n
Willow	<i>Salix sp.</i>	
Yellow-star thistle	<i>Centaurea solstitialis</i>	n
	<i>Vulpia microstachys</i>	
	<i>Medicago sp.</i>	
	<i>Epilobium sp.</i>	

References:

- Jepson Manual. 1993. Hickman, J.C., ed., University of CA Press, Berkeley, CA.  
 Kozloff, E. and L. Beidleman. 1994. Plants of the San Francisco Bay Region, Sagan Press.

## **APPENDIX VII**

Non-native Wetland Plants in SF Bay Region  
(Spring 2003)

<b>Appendix VII: Some Non-Native Species in the San Francisco Bay Region</b>						
(A. Breaux)						
[note that second listing in red indicates a different opinion on status of invasiveness.]						
<b>Common Name</b>	<b>Latin Name</b>	<b>Wetland Status<sup>a</sup></b>	<b>Invasive?<sup>b</sup></b>	<b>On Cal EPPC List?<sup>c</sup></b>	<b>Habitat Type<sup>d</sup></b>	<b>Source</b>
Oat bent-grass	Agrostis avenacea	FacW	NA		DB	2
Tree of heaven	Ailanthus altissima	FacU		A-2	U or TA	8
Giant reed	Arundo donax	FacW		A-1	FM, R	2, 6, 8
Wild oat	Avena fatua		NA		Gr	2, 6
<b>Wild oat</b>	<b>Avena fatua</b>			<b>AG</b>		<b>8</b>
Mustard	Brassica & Hirschfeldia incana	NG	NA		DB	2
Black mustard	Brassica nigra	NG		B	SW, U or TA	8
Ripgut brome	Bromus diandrus	NG	NA	AG	Gr	2, 6, 8
Soft chess	Bromus hordeaceus	NG	NA		Gr	2
Italian thistle	Carduus pycnocephalus	NG			Wide	
Hottentot fig (ice plant)	Carpobrotus edulis	NG		A-1	TM	7, 8, 10
Star thistle	Centaurea solstitialis	NG	Yes?		U or TA	4, 6
Yellow star thistle	Centaurea solstitialis	UPL		A-1	Gr	8,10
Goosefoot	Chenopodium berlandieri	NG	NA		DB	2
Bull thistle	Cirsium vulgare	FacU			R	8
Poison hemlock	Conium maculatum	FacW	NA	B	DB	2, 6, 8
<b>Poison hemlock</b>	<b>Conium maculatum</b>	FacW	<b>Yes?</b>	<b>R A</b>	<b>Up, TA</b>	<b>8, 10</b>
Pampus grass	Cortaderia jubata	NG	Yes	A-1	U or TA	4, 6, 7, 8
Cotoneaster	Cotoneaster pannosus	NG		A-2		8
Brass buttons	Cotula coronopifolia	FacW+	NA		DB	2
Arthichoke thistle	Cynara cardunculus	NG		A-1	Gr	6, 8
Bermuda grass	Cynodon dactylon	Fac			VP, Gr	
Scotch broom	Cytisus scoparius	NG		A-1	Up, TA	8, 10
Dittrichia	Dittrichia graveolens	NG	IA		DB	2
Ehrharta grass	Ehrharta erecta	NG			R	6
Water hyacinth	Eichhornia crassipes	Obl		A-2	CW	8
Tasmanian blue gum	Eucalyptus globulus	NG		A-1	R, Gr	8
Fennel	Foeniculum vulgare	FacU	NA??		DB, U or TA	2, 4
<b>Fennel</b>	<b>Foeniculum vulgare</b>	<b>FacU [in Reed 1988]</b>	<b>Yes?</b>	<b>A-1</b>	<b>TM, BM, FM?, Up or TA? Gr</b>	<b>8, 10?</b>
French broom	Genista monspessulana	NG	Yes?		SW; U or TA	4, 6
Barley, Mediterranean	Hordeum hystrix [formerly =geniculatum]	Fac	?			12
Barley, Mediterranean	Hordeum marinum	NG			DB, U or TA	2, 4
Iris	Iris pseudacorus	Obl			TM	7



Non-native Wetland Plants in SF Bay Region  
(Spring 2003)

Common Name	Latin Name	Wetland Status <sup>a</sup>	Invasive? <sup>b</sup>	On Cal EPPC List? <sup>c</sup>	Habitat Type <sup>d</sup>	Source
Speedwell??	Veronica sp.??				VP	
<sup>a</sup> Wetland Status indicating probable estimated occurrence in wetlands (from RMG 1993):						
Obl= Obligate =99%						
FacW = Facultative Wet = 67% - 99%						
Fac Facultative = equally likely to occur in wetlands and nonwetlands (34% - 66%)						
Fac U = Facultative Upland = 1% - 33%						
Up = Upland = < 1%						
<sup>b</sup> Note: Source 2 (Goals Report 1999) distinguishes between:						
NA = naturalized alien (less threatening to native species)						
IA = invasive alien (more threatening to invasive species)						
<sup>c</sup> CalEPPC List (Source #8):						
A-1 = Most Invasive Wildland Pest Plant						
A-2: Most Invasive Wildland Pest Plants; Regional [in SF Bay]						
B = Pest Plants of Lesser Invasiveness						
RA = Red Alert: Species with potential to spread explosively						
NMF = Need more information						
AG = Annual Grasses [of concern??]						
Habitat Types: TM = Tidal Marsh; BM = Brackish Marsh; FM = Freshwater Marsh; SM = Seasonal Marsh;						
VP = Vernal Pools; R = Riparian; Gr = grasslands; U or TA = Uplands or Transitional Area						
DB = Diked Baylands; CW = Coastal Waters						
Wide = Widespread						
Sources:						
1. P. Faber (1993)						
2. Baylands Ecosystem Habitat Goals Report (1999)						
3. Species & Community Profiles (2000)						
4. Martin Luther King Wetland Restoration Fourth Year Monitoring Report (2003), Wetlands and Water Resources.						
5. Pacific Commons Vernal Pool Project, Fremont, CA.						
6. Jepson Herbarium "Pest Plants in the East Bay" (no date)						
7. "Introduced Tidal Marsh Plants of SF Bay Estuary", SFEI, 1998.						
8 = CALEPPC List: Exotic Pest Plants of Greatest Ecological Concern in CA (1999).						
9. Bossard, Randall & Hoshovsky, 2000??						
10. BMP Ecosciences 2003)						
11. Green Valley Ck Plant List						
12. Resource Management Group (1993) based on Reed (1988). National List of Plant Species in CA.						
<sup>d</sup> Salsola soda is called Glasswort or Russian thistle. S. kali and S. pestifer have FacU status; not given for S. soda.						